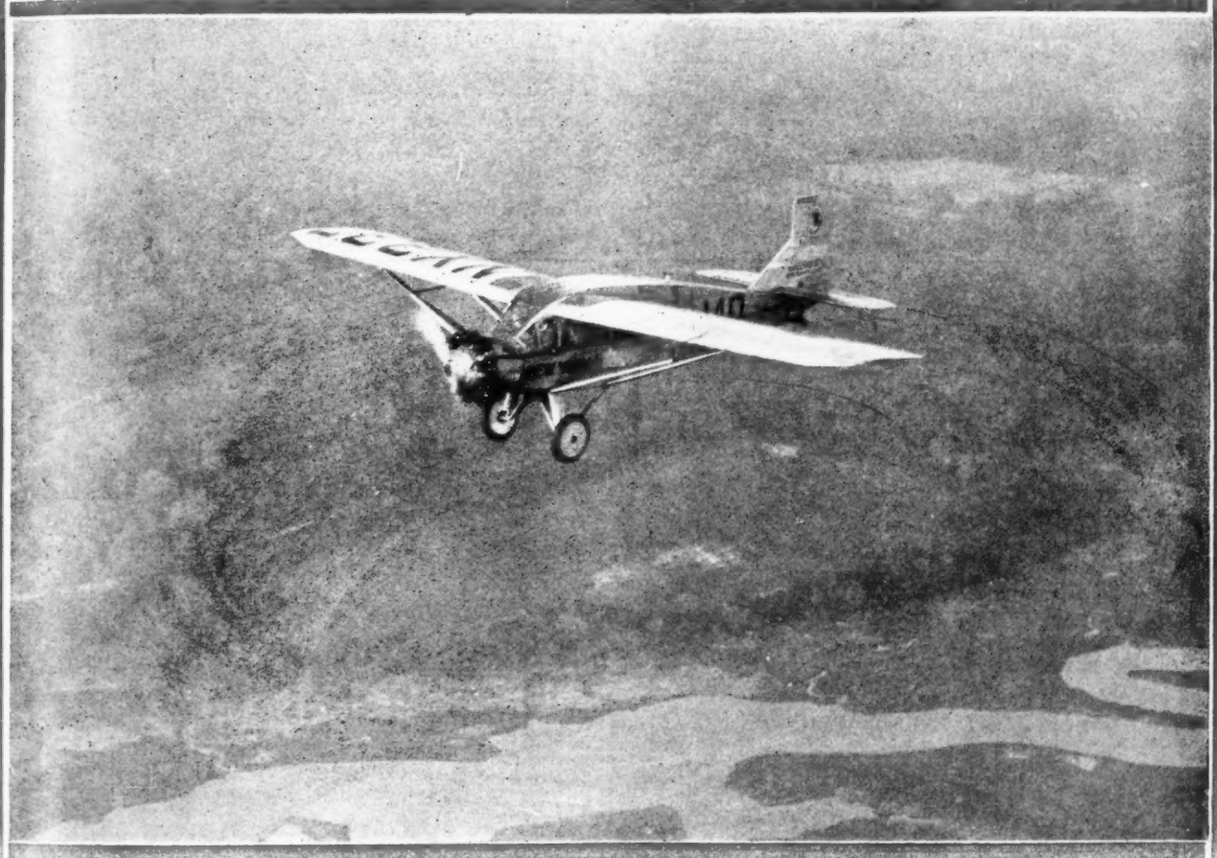
JUN 21 1927
TECHNICAL DEPT.

# AVIATION

*The Oldest American Aeronautical Magazine*

JUNE 13, 1927 | Issued Weekly | PRICE 15 CENTS



The "Columbia" a Few Hours Out From Roosevelt Field En Route To Germany

P. & A. Photo

VOLUME XXII

NUMBER 24

## SPECIAL FEATURES

CHANCE VOUGHT PRODUCTS MAINTAIN HIGH STANDARDS

THE ANODIC OXIDATION TREATMENT OF DURALUMIN

BIRD-LIKE DESIGN FEATURES BONNEY SEAGULL

AVIATION PUBLISHING CORPORATION

*Editorial and Business Offices*

250 WEST 57 STREET, NEW YORK

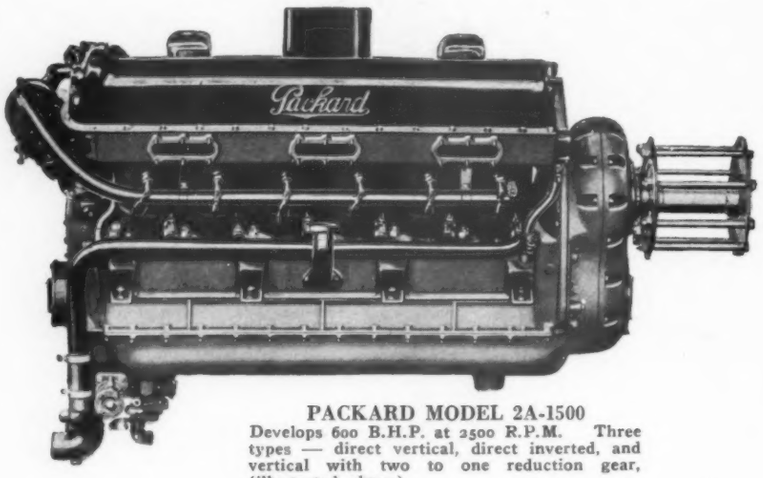
*Publication Office*

HIGHLAND, N. Y.

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y. under Act. of March 3, 1879

TOLEDO PUBLIC LIBRARY

*Twelve Years of Pioneering in Aircraft Motor Development 1915-1927*




PACKARD MODEL 2A-1500
Develops 600 B.H.P. at 2500 R.P.M. Three types — direct vertical, direct inverted, and vertical with two to one reduction gear, (illustrated above).

PACKARD'S pioneering in aircraft motor development has exerted a profound influence upon the entire aircraft industry.

Every Packard Aircraft Motor of today incorporates the lessons of more than a quarter century of leadership in building internal combustion engines for use in air, on land and in the water.

# PACKARD AVIATION ENGINES

ASK THE MAN WHO OWNS ONE

# *Now First*
# Of World's Greatest Commercial Airplane Companies

WACO is first in volume of sales in the Airplane Industry. Once more the general public has proven that it will always seek out the individual manufacturer who disregards outworn principles and practices and brings them something unmistakably new, unmistakably progressive and unmistakably superior in service.

This sweeping public endorsement of WACO AIRPLANES together with the fair dealer policies of the Advance Aircraft Company, makes the WACO AIRPLANE franchise — with its complete power range of from 90 to 250 horse power — one of the most desirable and eagerly sought dealer connections in the Airplane Industry.

MANUFACTURED BY ADVANCE AIRCRAFT CO., TROY, OHIO

## ANNOUNCING A NEW FLYING COURSE BY CURTISS FLYING SERVICE, INC.

Curtiss Flying Service, Inc. is now prepared to offer to a limited number of specially qualified students, a new type of flying course, designed particularly for those who intend to follow flying as a profession.

Through cooperation of the U. S. Army Air Corps, graduates of this course will be accepted as Reserve officers and be permitted to fly government aircraft at no expense to themselves. Thus they can rapidly fit themselves for positions as licensed commercial pilots.

Enrollment is limited and will be confined to R.O.T.C. graduates and men with college educations or the equivalent.

Further information will be furnished upon request. Applicants should state clearly their educational qualifications to avoid misunderstandings.

IN ADDITION—

We are continuing to offer our standard ten hour flying course which has started many famous pilots on the way to aeronautical success. Over 500 students have graduated from this course since 1919.

Curtiss Flying Service students are trained by the oldest flying organization in the world, operating one of the busiest airports in the United States. Our equipment and personnel are licensed by the United States Department of Commerce.

*"Flying time is here"*

**CURTISS FLYING SERVICE, INC.**

**Garden City, N. Y.**

Curtiss

# AVIATION

AVIATION PUBLISHING CORP.
*Business and Editorial Offices:*—250 W. 57TH ST., NEW YORK
*Cable Address:*—AEROENG
*Publication Office:*—HIGHLAND, N. Y.

EARL D. OSBORN, *President and Editor*
LESTER D. GARDNER, *Publisher*
GEORGE NEWBOLD, *Business Manager*
L. D. WEBSTER, *Treasurer*

Vol. XXII JUNE 13, 1927 No. 24


# Index to Contents


NEWS ARTICLES AND ITEMS

| | |
|---|---|
| Chamberlin Pilots Bellanca Plane to Germany.. | 1276 |
| Brainard Field Dedicated ..... | 1280 |
| European Air Firms to Experiment in Brazil.... | 1280 |
| Pittsburg Aero Club Model Contest..... | 1282 |
| Inter-American Commission Drafts Convention.. | 1283 |
| Van Orman Again Wins National Balloon Race | 1286 |
| Cairo-Cape Town Flight Ends Successfully.... | 1292 |

FEATURES AND DEPARTMENTS

| | |
|---|---|
| Editorials ..... | 1275 |
| Chance Vought Products Maintain High Standard of Quality and Performance .... | 1278 |
| Varney Air Mail Service Hits Stride ..... | 1281 |
| Junkers Builds New Passenger Monoplane .... | 1284 |
| The Anodic Oxidation Treatment of Duralumin | 1288 |
| Bird-Like Design Features Bonney "Seagull".. | 1290 |
| Night Flying Equipment for the Airdrome .... | 1311 |
| Foreign News ..... | 1318 |
| Airports and Airways ..... | 1320 |
| Publisher's News Letter ..... | 1330 |

| | |
|---|---|
| ADVERTISING INDEX ..... | 1325 |
| WHERE TO FLY ..... | 1328-1329 |
| AIRCRAFT SERVICE DIRECTORY ..... | 1331-1332-1333 |
| CLASSIFIED ADVERTISING ..... | 1334 |



*Subscription price: Four dollars per year. Canada, five dollars. Foreign, six dollars. Single current copies, fifteen cents. Back numbers, 25 cents. Advertising rates on application.*

*Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.*

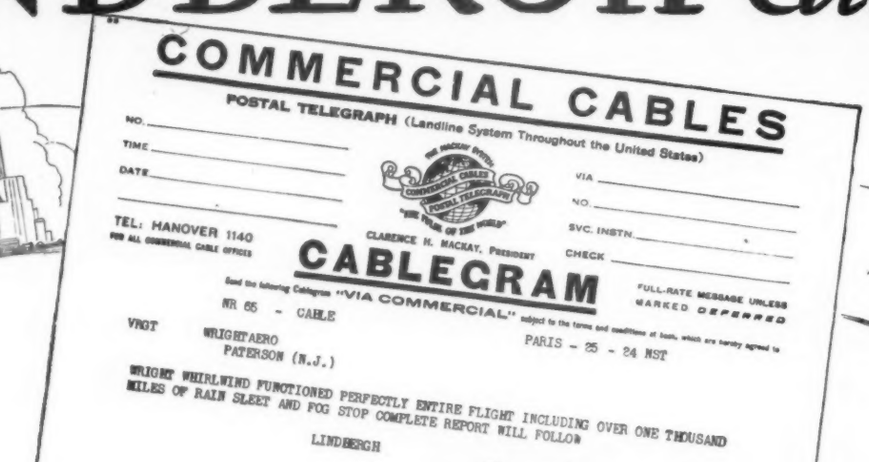


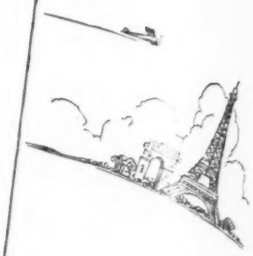
*Copyright 1927 by Aviation Publishing Corp.*


## *With the Editor*

The third airplane non-stop Atlantic crossing is now an accomplished fact and the art of aviation is advanced to another record mark. The first flight of Alcock and Brown from Newfoundland to Ireland showed that trans-Atlantic flying was possible. Captain Lindbergh's New York to Paris flight not only confirmed that possibility in a most spectacular manner but established a new non-stop distance record for heavier than air machines. The Chamberlin-Levine New York to Germany crossing is still another step forward. It has lengthened the non-stop distance record, more or less eliminated the layman's belief that luck was a great governing factor in Captain Lindbergh's achievement, increased the weight per horsepower of the Wright Whirlwind and proved that trans-Atlantic flying is not a commercial aviation day dream. Too great praise cannot be given to both recent flights. They have created a confidence in aircraft with the public that will be invaluable both here and abroad. American pilots, designers and engine builders may rightfully take pride in the feat. It once more gives the United States a prime position in aeronautical progress and development.

# LINDBERGH Cabled


COMMERCIAL CABLES
POSTAL TELEGRAPH (Landline System Throughout the United States)
NO.
TIME
DATE
VIA
NO.
SVC. INSTN.
CHECK
TEL: HANOVER 1140
FOR ALL COMMERCIAL CABLE OFFICES
CLARENCE H. MACKAY, PRESIDENT
CABLEGRAM
FULL-RATE MESSAGE UNLESS MARKED DEFERRED
Send the following Cablegram "VIA COMMERCIAL" subject to the terms and conditions of both, which are hereby agreed to
NR 65 - CABLE
PARIS - 25 - 24 NST
VNGT
WRIGHTAERO
PATERSON (N.J.)
WRIGHT WHIRLWIND FUNCTIONED PERFECTLY ENTIRE FLIGHT INCLUDING OVER ONE THOUSAND MILES OF RAIN SLEET AND FOG STOP COMPLETE REPORT WILL FOLLOW
LINDBERGH



CAPTAIN Charles A. Lindbergh's world stirring flight with a Wright Whirlwind Engine from New York to Paris in safety on May 20-21, 1927, is but the culmination of a remarkable series of aeronautical successes and records covering the past three years.

It is significant, too, that the planes of all three Transatlantic Flight aspirants—Byrd, Chamberlin and Lindbergh—were powered with Whirlwinds, proof positive that the faith of America's greatest airmen was pinned to the safety of America's greatest air-cooled aeronautical engine.

Wright Whirlwind Engines have been the inspiration of a vast majority of the most efficient, safe plane designs in the air today.

Send for Bulletin 17G an interesting, non-technical booklet showing twenty-eight of America's leading, safe airplanes powered with Wright Whirlwind Engines.

*Wright Whirlwind Engines are in use on 11 of the most important United States air mail routes and fly more mileage per day in safety with United States mail than the distance between New York and San Francisco.*

**Wright Marine Engine Successful Performances**

Wright Typhoon Marine Engines hold a high place in the light cruiser and express runabout marine field.

1. *1924, won first and second place in the Annual Gold Cup Regatta, Detroit, Mich.*
2. *1925, express runabout "Teaser" beat the Empire State Limited from Albany to New York establishing a record of 2 hours and 40 minutes for this trip.*
3. *1926, runabout "Imp" was timed for the fastest lap ever made in the Gold Cup Races at Manhasset Bay, N.Y.*

**Wright Whirlwind Engine Successful Performances**

1. *In 1926 Whirlwind Engines flew more than 1,750,000 miles safely in commercial and private airplanes.*
2. *All Whirlwind Engines finished with a perfect score in the (Ford) Annual Reliability Tour, 1925.*
3. *Carried Commander Richard Byrd over the North Pole and back in a Fokker three Wright Whirlwind engined plane, 1926.*
4. *Won first, second and third place in 2550 mile (Ford) Annual Reliability Tour, 1926.*
5. *Established new World's Endurance Record of 51 hours, 11 minutes and 20 seconds on a Wright-Bellanca plane, Chamberlin and Acosta, pilots, 1927.*
6. *Powered Captain Lindbergh's Ryan Monoplane in his non-stop flight from New York to Paris, 1927.*
7. *In 1926 Whirlwind Engines flew more than 2,000,000 miles in the service of the U.S. Navy.*

RELIABILITY—DURABILITY—ECONOMY

# WRIGHT

AERONAUTICAL CORPORATION *Paterson, N. J., U. S. A.*

AVIATION

*The Oldest American Aeronautical Magazine*

VOL. XXII JUNE 13, 1927 No. 24

## Scenic Beauty From the Air

IN GERMANY, recently, five airplanes made an exploratory flight across the Alps to blaze the trail for more Alpine air routes.

No other mode of travel offers such a picturesque view of the earth as is the panoramic scene that unfolds itself to the traveler in an airplane, who views the world from above. The Europeans have seized upon this spectacular attractiveness of air travel to stimulate popular interest in their transport services, and the regard has been found gratifying.

In America the exploitation of scenic beauty as a stimulator of passenger traffic long has been a strong incentive with the railroads, and the flow of much such traffic has been diverted to lines that have built up a reputation as scenic roads. Likewise steamship lines operating on inland waters have rested their bid for patronage on the picturesqueness of their routes and have found it a potent drawing card, while our air transport services, generally have been content to harp on the single string of "saving time."

The airplane offers a far better vantage point for seeing the natural panorama spread out underneath, for miles around, than does the tail end of an observation car, rushing through narrow gorges or skimming across valleys, close to the ground. The picturesque "Horse Shoe Curve" in Pennsylvania is disclosed to the train traveler merely as momentary glimpses of a small section of scenic splendor, as compared with the picture that unfolds itself to the air traveler who sees, not only such a beauty spot in its entirety, but the whole grand setting of peaks, valleys, forests and streams that encase it like a frame befitting the picture.

The United States is particularly favored with colorful highlands that stretch through the heart of the populous East from New England to Tennessee, and which in the West, form one gigantic panorama from Washington along the entire Pacific coast, and from Montana to Mexico. Yet the alluring field of scenic air tours, which the German air lines are now exploiting, has been left untouched in this country. With our numerous air services, scattered in localized operations over practically every state in the union, the time element alone has been stressed as an inducement to travel by air, while the scenic appeal has been altogether overlooked, or barely touched upon. It would seem that air transport operators would have been quick to sense the advertising possibilities suggested by the enthusiastic comments of delighted travelers over the scenic wonders of their trips.

## Co-operation of Trade Bodies

HARTFORD, the monthly publication of the Chamber of Commerce of Hartford, Conn., in a recent issue features outstandingly the aviation activities of that city. It is a splendid exposition of what Hartford has to offer in the way of aviation facilities and of the benefits to accrue to its business interests by the encouragement and support of the commercial air operations available to its citizens. Detroit, Buffalo, Chicago, Cleveland, and other large cities, through their trade organizations, and through the official publications of such organizations, also have made striking surveys of the commercial aviation in their midst.

The recognition by Boards of Trade and Chambers of Commerce of commercial air activities as an important factor in the business life of the community has a real practical value. With the weight of commercial authority behind it, such recognition and endorsement goes far toward building up air consciousness in the community and impressing the business element with the economic value of air transport. Selling aerial transportation is a matter of patient and ceaseless effort, and the support that is given this effort by the Boards of Trade and similar organizations through their publications is of the greatest help.

No more practical work for the advancement of aviation can be performed by local aero clubs or by energetic groups or individuals interested in flying than affiliation with local trade bodies, and using their influence to gain proper recognition for all practical aviation activities.

## The Balloon Still Thrills

GOOD meteorological service and expert piloting enabled the winners to get the last possible mile out of the flight under the air currents then prevailing, marked the recent national balloon elimination race out of Akron, Ohio. The keenness of the navigation that marked this contest may be judged from the fact that in a 715 mile flight the second place balloon sat down about 50 miles from the winner, and the third place entry landed about 50 miles from the balloon that finished in second place.

The balloon was man's first achievement in flight. For more than a century it found utilization as an adjunct to the military arm, principally in a stationary, or captive state, for observation purposes. However much as its usefulness has been overshadowed by the dirigible and the airplane, the free balloon has never lost its place in the affections of the people as a spectacle and sport of first magnitude.

# Chamberlin Flies Bellanca Plane to Germany

## *Powered by a Wright "Whirlwind" Engine the "Columbia" Carries Pilot and Passenger to New World's Non-Stop Distance Record*

FOR THE second time within the last thirty days an American built airplane with an American born pilot at the controls has taken off from the shores of America and winged its way to a safe landing on the mainland of Europe. This time it was the Bellanca monoplane "Columbia", built by the Wright Aeronautical Corp. and powered by a Wright "Whirlwind" engine, that rose from Roosevelt Field, L. I. at 6.05 A. M. Saturday June 4 and carried its pilot, Clarence D. Chamberlin and a passenger, Charles A. Levine, to Helfta, Germany where it landed at midnight Sunday June 5 and established a new world's non-stop distance record. The Columbia traveled 3,905 mi. in 43 hr.

The ultimate goal of the trans-Atlantic fliers was the city of Berlin but a shortage of gasoline brought about the landing at Helfta. After taking on fuel at Helfta Chamberlin took the Columbia into the air again but owing to the compass being put out of commission by the landing, and going astray in bad weather, a second forced landing was made in a marsh near Kottbus, Germany, and the propeller broken, thus halting temporarily the flight to the German capital.

### Carried 445 Gal. of Gasoline

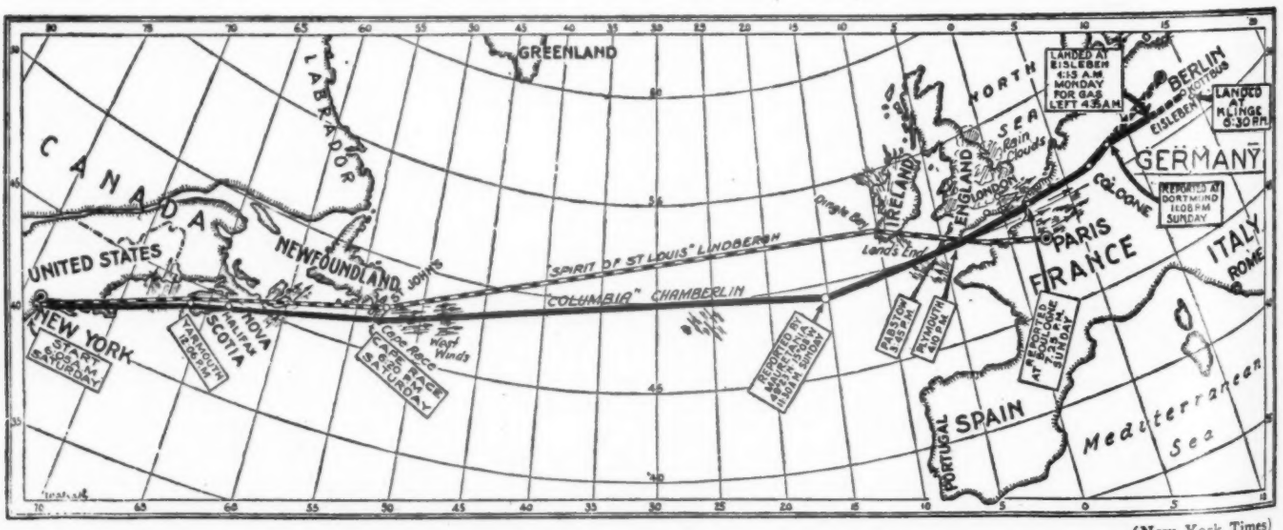
Soon after Chamberlin had announced definitely at Roosevelt Field that he would take off, Carl F. Schory, Chairman of the Contest Committee of the National Aeronautical Association, installed a barograph in the Columbia and sealed it. The pilot then made a final inspection of his plane while food supplies were prepared and placed aboard. They included ten chicken sandwiches made with toasted rye bread, two bottles of chicken soup, a bottle of coffee, half a dozen oranges and three tins of the regulation United States Army "iron" or emergency rations.

The 390-gallon tank in the fuselage was loaded to the brim. On top rested a number of drums that held an additional sixty-five gal., or a total of 455 gal. Stowed compactly round the edges of the tank were a rubber collapsible raft and a pair of sectional oars for use in case the plane was forced down. A Very pistol, which fires a bright flare capable of lighting the sky for a considerable distance, water lights, which ignite as soon as they touch water, red flares, a box of safety matches and an electric flashlight with two storage batteries were in position.

Little time was lost in getting the monoplane on the runway and the crowd was kept at a safe distance by a large force of motorcycle and foot policemen. Chamberlin made two attempts to get the Columbia into the air and succeeded the second time. On the first attempt he throttled his motor and turned back when some bystanders got in the path of the onrushing plane. The final take-off was a superb bit of pilot-

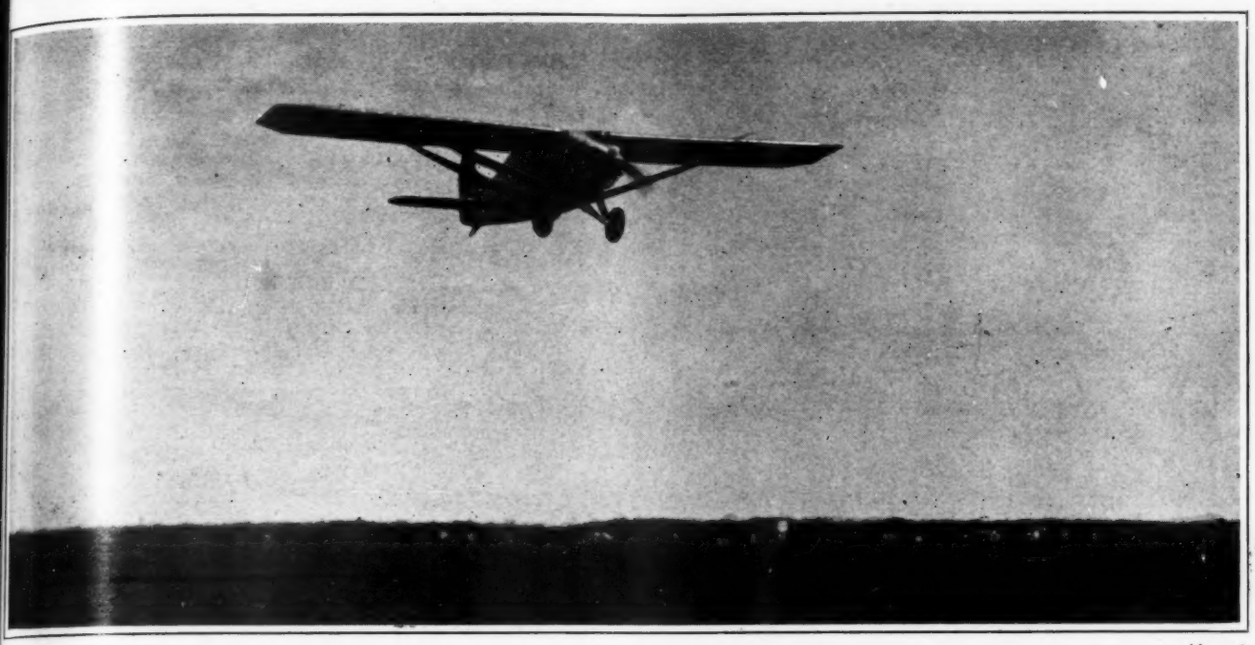
(Acme)

Chamberlin and Levine just before the start




(New York Times)

Map drawing of the "Columbia's" route according to New York City Time.



(Acme)

The "Columbia" off the ground and on the way to Germany.

ing. The total load of the Columbia when she took off was approximately 5,450 lb. as against a total weight of 5,150 lb. of Captain Lindbergh's plane.

The plane still carried the notice that the flight was under the auspices of the Brooklyn Chamber of Commerce. On the upper part of the rudder was the figure Columbia, painted in colors. It afforded a striking contrast to the silver gray of the rest of the machine. The license number NX 237 and the racing figures 140 were painted on the side in black. The word "Paris" on the fuselage had been painted out.

One of the features of the flight was the sighting and circling of the steamship Mauretania bound for New York. Chamberlin brought the Columbia down to within 150 ft. of the water, circled the ocean greyhound and then sped on to the eastward.

The first landing at Helfta took place without any trouble whatever. Men working in the fields near by—one of them by curious chance a German air mechanician out for a holiday on his mother's farm—provided fuel and helped the airmen to get under way again.

When the tired watchers, who had been encamped at Tempelhof Field in Berlin for twelve hours or more, suddenly learned of the Columbia's second forced landing, a mad rush for Kottbus ensued. The first plane to start for the scene of the mishap was a German Government machine with the Brandenburg representative in the Ministry of Transportation, De Witt Poole, counselor of the American Embassy, and several officials of Lufthansa. Ambassador Schurman urgently desired to join the party, but was dissuaded by German functionaries on the ground that it was better for him to remain in Berlin to organize details of the welcome for the airmen. Eight other planes loaded with German and foreign newspaper men, photographers and movie operators one by one winged their way in the wake of the official craft.

## Air Services in Switzerland Developed

The first regular air service in Switzerland was started by the Ad Astra Aero Co. of Zurich in 1919, when that company's craft made 160 flights between Zurich, Berne and Lausanne, and carried a few passengers and 23,520 pieces of mail, and it was learned with the gradually widening experience that longer distances would have to be flown over regularly and at high speed. Thus in 1924 this company extended its service to Munich and Vienna.

Later cooperative arrangements were developed between Swiss and other companies. The Ad Astra cooperates with the German Lufthansa company in the Geneva-Budapest service—the Swiss company operating to Zurich and the German company from that city eastward. The two companies cooperate in the same way in the Geneva-Lausanne-Zurich-Stuttgart-Erfurt-Halls-Berlin service, the Ad Astra serving between Geneva and Zurich. It is planned to extend this service southwestward—Genevea-Marseilles-Barcelona-Madrid—using the German company's equipment and personnel. Another form of cooperation is illustrated by the arrangement by which the other Swiss company (the Basel Air Service Co.) and the Rogal Aviation Co. of Holland, operate the new Geneva-Zurich-Basel-Brussels-Rotterdam service. The craft of one company alternate with those of the other between Basel and Rotterdam.

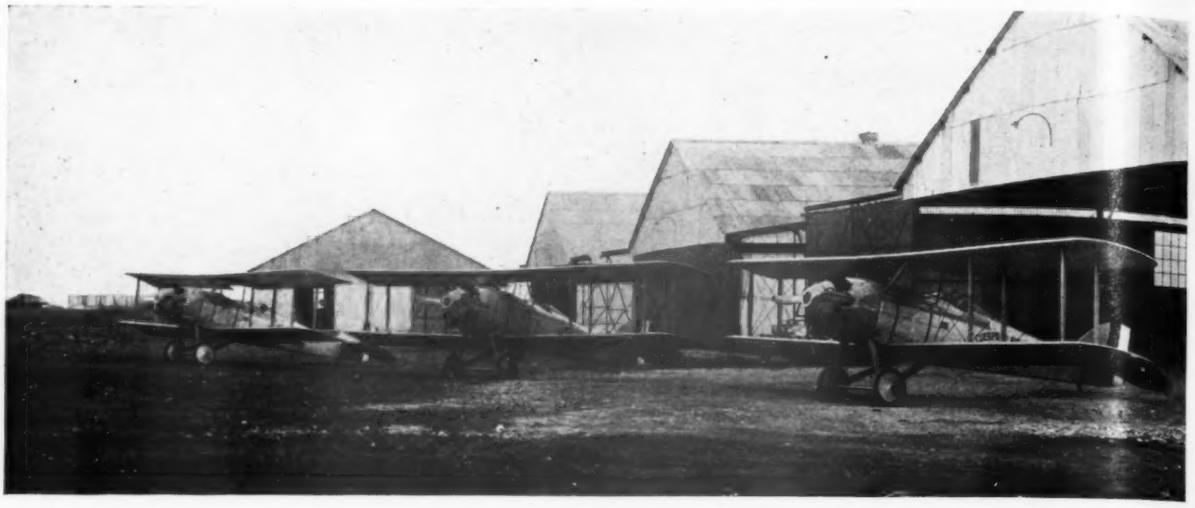
The Swiss air channel between the Alps and the Jura Mountains is especially suitable to traffic between central and western Europe and developments point to the increasing importance of Swiss cities as air traffic centers. Efforts are being made to increase the movement in all directions of valuable and perishable goods by air.

The necessary subsidies for the air services have been provided largely by the cantons, communes and associations, the Federal contribution being limited to some 150,000 Swiss francs ($30,000) for the carriage of mail and prizes for regularity of service. It is planned to have the national government assume greater authority and pay a larger subvention. Lighthouses, signal stations, emergency fields for night flying and improved weather reporting, are subjects of public discussion.

The Second International Aeronautical meeting will be held between August 12 and 21, 1927 at Zurich. Its program will be national and international in nature, and great interest is expected to be aroused.

## Spanish Pilot to Try Spain to New York Hop

Plans are now being made by Commander France of the Spanish Army, who recently flew from Spain to Argentina, for a flight from Corunna, Spain to New York. He expects to take off next August and will pilot a Spanish-built plane equipped with two 700-h.p. engines and capable of developing power for a cruising radius of 2,485 mi.



Three Chance Vought UO1's in the Cuban Air Service.

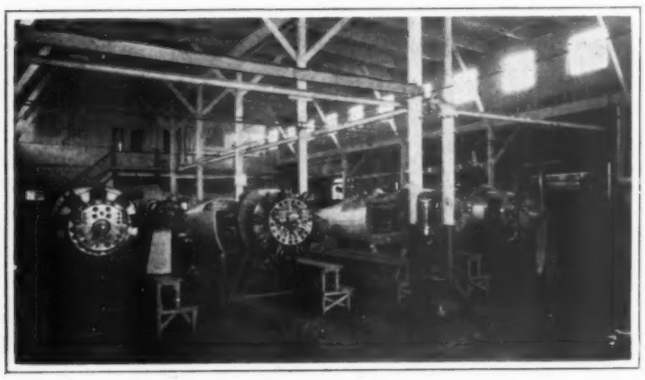
# Chance Vought Products Maintain High Standard of Quality and Performance

## *From the Original VE-7 Model to the New "Corsair," Which Holds Four World's Records, Soundness of Design has Been a Governing Factor*

AMONG THE leaders in the aeronautical industry in the United States the name Vought stands high. To those who are familiar with modern airplanes, Vought is the symbol of quality, an immediate indication of excellent aerodynamic qualities, sturdy construction, genuine serviceability, fine workmanship, and painstaking care given even to the minutest detail.

The Vought organization always let their product tell its own story, and those who fly know it well. The soundness of design used by the Vought engineers has always resulted in planes with unsurpassed all-around performance for the class of work to be done.

The aeronautical industry in general has had many ups and downs since the World War, but the Chance Vought Corp. has enjoyed a steady business, which has increased each year, and still kept its facilities well in line with the gradual growth of the industry. This steady demand for Vought planes is due entirely to one thing—their superiority in the particular field for which they were designed.



Assembly floor in Chance Vought factory

The Vought foresight and leadership in aerodynamics is well exemplified by their adoption of air-cooled engines exclusively several years ago. More air-cooled engined airplanes have been built in the Vought factory than by any other manufacturer in the country and the soundness of this policy has been conclusively demonstrated in a spectacular manner.

Credit should also be given the Vought organization for originating the Navy's air-cooled engine program which has resulted in the manufacture of the Wright R-1200 engine, and the Pratt & Whitney "Wasp" engine. These engines have proved to be a real development in American power plants, and it was the requirement of such an engine for the newest Vought, the "Corsair" that caused the Navy Department to enter this particular phase of development.

### Each Model an Advance in Design

Beginning with the VE series in 1918, down through the UO series and to the present "Corsair" types, each Vought model, by its advanced design, proven performance and high quality, has immediately established its merit and resulted in real production runs in the Vought plant.

The first Vought Model, the VE-7, was built for the U. S. Army Air Service, entered in the Army competition for advanced training planes, and was easily the winner. A large number of this model were built for the Army and most of them are still in service. A number of the VE series were also purchased by the U. S. Navy for advanced training and gunnery purposes.

The first U. S. aircraft carrier, the U.S.S. "Langley", was originally equipped with observation planes of the Vought VE-9 type exclusively. Many of these planes are still in operation on the "Langley", and have demonstrated their

ability to stand up for many years under the strenuous service of deck landings with arresting gear.

The first of the UO series was the Model UO-1, a two-place observation plane of the convertible land-or-water type. This model was adopted by the U. S. Navy as the exclusive two-seater seaplane equipment for the catapult equipped battleships and fast scout cruisers, two planes of each type being assigned to each ship.

The service given in that most strenuous of all aircraft tests, catapulting, was so satisfactory that the Navy has purchased some 200 of these planes for many other types of service, including use at Naval Reserve Air Stations. This model UO-1 is also being used in the Cuban Air Service, the Peruvian Air Service, and in several other South American countries.

## Performance Proves the Quality

One of the last of the UO series, the FU-1, was a single seater training fighter. This model was the first production type in which a supercharger had been installed with an air-cooled engine. The performance of this ship is remarkable, particularly at altitude. The ceiling of this plane is 30,000 ft., and the speed at 15,000 ft. is over 150 m.p.h.

The selection of Vought planes, the Model UO-4, by the United States Coast Guard as the first plane equipment for their newly formed Air Service, is also indicative of the quality of service given by these sturdy planes. This selection was made only after a number of Vought planes had been borrowed from the Navy, and given strenuous tests for a considerable period.

The real flying qualities and wide preference shown by Navy flying personnel is well indicated by the operating record established by Vought planes in the U. S. Navy during the fiscal year 1926. During this period, in the U. S. Navy alone 25,108 hours, approximately 2,885,000 miles of flying, was done in Vought planes. This is three times as much as was done in the Navy in any other type built since the World War. And it did not include the hours flown in the U. S. Army Air Service in the Cuban Service and in the Air Services of several countries in South America.

### The Pilots of the Record Breaking "Corsair"

Lieut. G. R. Henderson, U.S.N.

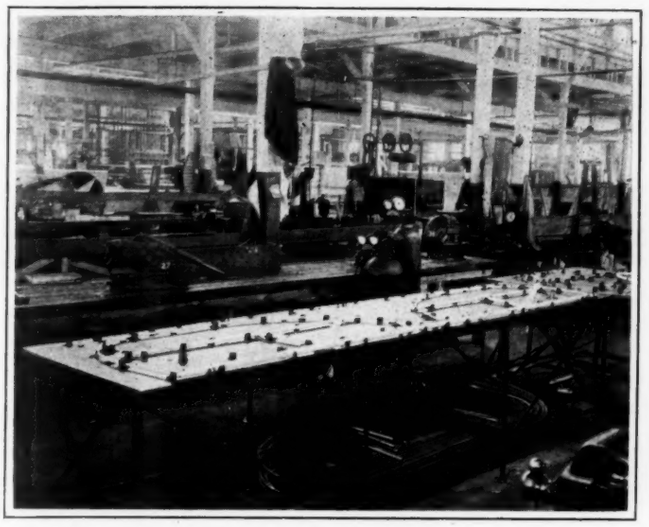
Lieut. S. W. Callaway, U.S.N.

Lieut. J. D. Barner, U.S.N.

Lieut. R. Irvine, U.S.N.

## Vought "Corsair" Now in Production

The latest Vought model, the "Corsair" is now in production and even in the short time it has been in the air it has far outshone the previous models which had been so signally successful. This plane incorporates many new and interesting features and is designed around the Pratt & Whitney "Wasp" air-cooled engine of 425 hp.



Chance Vought Welding Dept.

The first plane of this model, after having been put through all the strenuous service tests by Navy test pilots, including tests as landplane, as seaplane and for catapulting, all of which required about six months of almost continuous flying, established four new World's Records within a period of five weeks.

On April 14, Lieut. G. R. Henderson, U.S.N., flying this standard "Corsair" which had been used throughout the tests, made a new World's Seaplane Altitude Record of 22,178 ft., carrying a ballast load of 1102 lb. exclusive of pilot, fuel, equipment, etc.

On April 23, flying the same stock plane, Lieut. S. W. Callaway, U.S.N., made a new seaplane speed record for 100 km. around a closed course of 25 km., carrying the same ballast load. The average speed attained was 147,263 miles per hour.

A week later, on April 30, Lieut. James D. Barner, U.S.N., under the same conditions and with the same plane averaged 136.023 m.p.h. for 500 km.

## New World's Seaplane Speed Record

A fourth World's Record was made on May 21, when Lieut. Rutledge Irvine, U.S.N., took the same plane, and flying around a short course of only 25 km., made a new World's Seaplane Speed Record for 1000 km. when he averaged 130.93 m.p.h., 27 m.p.h. more than the former record.

Among the many interesting results shown by the "Corsair" Navy trials, was that this plane as a two-seater with 500 lb. more useful load than the latest type single seaters, showed only a few miles lower high speed at sea-level, while in climb, ceiling, maneuverability, and altitude performance, it actually was superior to the pursuit types fitted with the same engine.

Pictures of the Chance Vought airplanes are printed on the center spread of this issue.

P. & A. Photo
Captain Lindbergh with M. Bleriot, the famous airman who flew across the English Channel in 1909, and Ambassador Herrick.

## N. A. C. A. Publishes Airfoil Report No. 260

Report No. 260, covering "The Effect of a Flap and Ailerons on the N. A. C. A. M-6 Airfoil Section," compiled by George J. Higgins and Eastman N. Jacobs, for the National Advisory Committee for Aeronautics, contains the results obtained at the Langley Memorial Aeronautical Laboratory on an N. A. C. A. airfoil, fitted with a flap and ailerons, and tested in the variable density wind tunnel at a density of 20 atmospheres. Airfoil characteristics are given for the model up to 48 deg. angle of attack with the flap set at various angles, and also with the ailerons set at similar angles. The approximate lift distribution and the center of pressure variation along the span are determined with the model at 18 deg. angle of attack and with the ailerons displaced 20 deg. Approximate rolling moment and yawing moment coefficients are determined for the various aileron settings.

A comparison of the calculated angles of zero lift and the calculated lift and moment coefficients with those observed is given in the appendix. Report No. 260 may be obtained upon request from the National Advisory Committee for Aeronautics, Washingaon, D. C.

## European Air Firms to Experiment in Brazil

According to advices from Vice Consul R. Cahn, Rio de Janeiro, made public by the Department of Commerce, aerial navigation in Brazil has been a subject of discussion for several years but little has been done toward the establishment of services until recently, when three European companies were granted permission by the Brazilian Minister of Transportation to undertake aerial navigation on an experimental basis.

The Junker company was recently given permission to undertake a propaganda flight from Buenos Aires to Rio Grande and Porto Alegre. Previously, the Minister of Transportation signed a contract with the Condor Syndikat establishing an aerial, postal and passenger service between different ports of Brazil; one to extend from Rio de Janeiro to Rio Grande, stopping at Santos, Paranagua, Sao Francisco, and Florianopolis, one between Rio Grande and Santa Victoria do Palmar, extending on to Montevideo provided such plan is acceptable to the Uruguayan Government. The Latecoere Company has recently been authorized to commence aerial navigation in Brazil on an experimental basis. All of these companies are making the necessary preparations to carry out their plans, and it is expected in Brazil that actual flights will be commenced in the near future.

## Brainard Field Dedicated

The official dedication of Hartford's Municipal Airport and base of the Connecticut National Guard, 118th Observation Squadron, was held on Saturday, May 21, at Brainard Field. More than fifty planes, including the local National Guard unit, took part in the exercises. Lieut. Col. Benjamin D. Foulois, Commandant of Mitchel Field, flew to the dedication, as official representative of the Army. Assistant Secretary of the Navy for Aeronautics Edward P. Warner, piloted by Comdr. D. G. Leighton, arrived at the field at one o'clock. Comdr. E. E. Wilson, chief of the design section of the Navy Dept. was present as the guest of the Pratt & Whitney Aircraft Co. and was largely responsible for the presence of a number of Marine Corps and Navy Department planes. It was through his efforts that the "Los Angeles" was brought to Hartford.

The Marine Corps had twleve pursuit planes, a Navy Ford Transport and an auxiliary plane at the dedication. Four of the pursuit planes were equipped with Pratt & Whitney Wasp engines, under the command of Major Brainard. The Navy Department was represented by Commander Wick in a Vought VE-9; Lieutenant Commander Miles in a D-H; and Lieutenants Calloway, Barner and Henderson, of the Anacostia Air Station in pursuit planes, powered with Wasp engines.

The program of the afternoon started with an inspection of the Brainard Field equipment, which proved to be very efficient for a municipal and National Guard field. Following the inspection, Major Ladd, Commandant of the Connecticut National Guard unit, led a formation of National Guard planes in maneuvers on the field. This was followed by formation flying by the Marine Corps Squadron and balloon chasing by Lieutenant McClellan of the Marine Corps in a Curtiss Hawk and Lieutenant Eller, the Army Instructor, for the National Guard, in a VE-7. Throughout the entire ceremonies, the "Los Angeles" was cruising over the field in constant radio communication with those below. Next came a flying exhibition by Lieutenant Sanderson, of the Marine Corps, and an impromptu race between three of the Marine Corps planes. The program ended with a parachute jump by one of the National Guard members.

During the afternoon, Colonial Air Transport, Inc. carried guests and visitors on short hops in its three-engined Fokker plane. Governor Trumbull was a prominent figure in the day's performance. A crowd of between fifteen and twenty thousand attended the dedication.

Governor Trumbull gave a dinner for the leading officers and civilians during the evening and the National Guard entertained the pilots at a dinner.

H. M. King Faisal of Iraq reading an address after having named the Imperial Airways passenger plane, "City of Baghdad", at Baghdad airdrome on April 12. Sir Henry Dobbs, the British High Commissioner in Iraq is seen in the gray top hat.

# Varney Air Mail Service Hits Stride

## *Completes Year of Successful Operation Over Route C.A.M.5 Despite Extreme Adverse Weather Conditions*

By CHAS. T. WRIGHTSON

AFTER SOME difficulties, service over Route C.A.M. No. 5 from Salt Lake City to Pasco, Wash. got under way on June 1, 1926 for a year of undisputable success, operating with 6 Wright Whirlwind J4-B engined Swallow mail type planes.

It is a year at this writing that the service has been in operation and a maximum possible efficiency of performance been rendered. The Winter of '26 and '27 was one of the worst experienced in the Northwest. Under normal seasonable conditions a service eclipsing even that of the past year will be performed.

Salt Lake City is the eastern terminus of the route with Pasco, Wash., as the northwestern. The run is cut at Boise, Idaho, where is located the main operating and repair depot

Swallow with J-4B Whirlwind after one year's service on Route C.A.M.5.

and forms the base for the operating personnel. Leaving Salt Lake City on arrival of the westbound trans-continental mail, the flight is via Boise, Idaho, to Pasco, Wash., arriving at the latter point in time to connect with fast mail trains to the principal cities of the Northwest, namely, Seattle, Portland, and Spokane. The eastbound schedule leaves Pasco upon the early morning arrival of the mails from these same points and connects with the New York bound transcontinental at Salt Lake City.

Thus, mail leaving Seattle, etc., on Saturday evening arrives in Salt Lake Sunday afternoon, Chicago early Monday morning and New York Monday afternoon. Seven day service was established over this route on April 18th last.

For the past eleven months of operation an efficiency record in excess of 90% was maintained—this, of course, approximating 100% through the Summer months and dropping slightly below in the Winter.

The efficiency of the mechanics may be appreciated when the following figures are digested:

Performance of 7 J-4-B Whirlwind engined Swallows June 1st to April 30th:—
3529 hr. 45 min., or approx. 320,000 mi.
Cost of repair parts for engines $280.82.
2 forced landings on account of engine failure.
1 account plane failure (gasoline line).
11.5 gal. gasoline p.h.
2.2 qts. oil per hour (including oil change at 12 hr.) or .52 quarts per hour between changes.

Of the two engine failures, the cause of one was the breakage of a piston, the other was due to improper oil being used where it was impossible to obtain our regular lubricant—Zerolene Aero Oil No. 1 & 2. Other possible failures have been detected and prevented by rigid daily inspection. Engines are overhauled at 300 intervals and valves are ground at 150 hr.

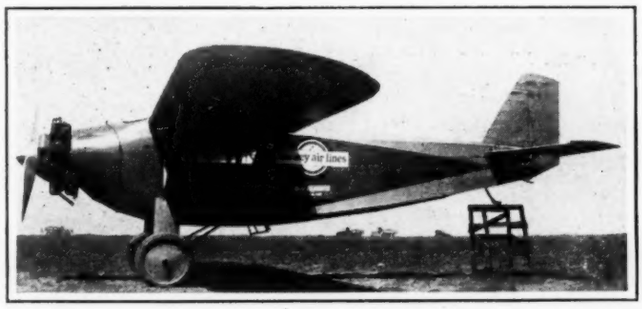
To date, the only replacements have been complete sets of rings in the second thorough overhaul of each engine, one wrist pin and bushing, two pistons, six inner valve springs, four rocker arms and no valves. All amounting to a cost of $280.82.

Due acknowledgement must be given to the Wright Whirlwind engine that is fast winning fame for itself in daily service throughout the world.

We were catapulted into a hole of circumstances that will long be remembered—we staked everything on the Whirlwind to pull us out. The Wright Aero Corp. delivered the goods in record time and now our past year's performance of continued unfaltering service is the most fitting testimonial that we can think of to adequately express our belief in the qualities of the Wright Aero Corporation's product.

All credit for the past year's success must be given to the pilots and mechanics forming the operations group. The operating personnel under the direction of Chief Pilot and Manager Leon D. Cuddeback consists of pilots Paul P. Scott, who was one of Otto Praeger's first, C. C. Price, Paul A. Andert, Geo. H. Buck, and Joe W. Taff; the mechanical force of Chief Mechanic Chris De Valschow; Engine mechanic Frank Rastler, Guy Gregory, Ralph Fifer, at Boise; H. C. Larsen at Pasco and F. E. (Barney) Barnard, Salt Lake City.

A word here must be said of our payloads—past, present and future, and that part of the organization responsible for it. Traffic Manager Frank P. Bell with offices in Seattle, Wash., has under him a capable staff of men working diligently upon the problem of putting the unlimited values of air mail in the most effective manner before the mailing



Breese-Wild plane now in temporary service on route C.A.M.5.

public. With branch offices in Portland and Spokane and represented by Will H. Brown and Claude V. O'Callaghan respectively, these men are largely responsible for the 50,211 lb. of air mail carried in the past year and for its growth from the first month of 98 lb. daily to the present load of 160 lb.

With the sales force batting heavily and another possible reduction in postage rate, capacity loads should soon be a realization. Aside from mail load promotion, the passenger and express situation in the Northwest is being studied as a supplement to increasing the gross income. What the logical steps will be to meet with this situation is hard to predict but that we will not have long to prepare is everywhere the consensus of opinion.

---

## Fifty Thousand Attend Aeronautical Show

It is estimated that over 50,000 people visited the Aircraft Display held in Washington, D. C., from May 2 to 6. Over 4,000 people were given flights.

## Pittsburgh Aero Club Model Contest

By RAY A. TUCKER

The Aero Club of Pittsburgh held its Second Annual Boys Model Contest on Saturday afternoon, May 21, at Rodgers Field, the Municipal Airdrome. The weather was clear and the air still, making it an ideal day for the many boys who participated to fly their models at their best. No records were broken but nearly every boy had great success, giving keen competition to each other.

The contest was divided into two parts, one the duration section and the other the model section. There were many models of clever design and beautiful workmanship which received the admiration of the judges, who were as follows: Col. William Thaw, Hon. James M. Magee, Col. Harry C. Fry, Jr., Major Lester D. Gardner, Capt. Thomas S. Voss and Raymond M. Marlier, president of the Aero Club.

Winners in the duration section of Model Plane Contest held by the Aero Club of Pittsburgh.

The "Pittsburgh Sun" materially assisted the Aero Club from the standpoint of publicity and consequently a large crowd of spectators were present to give the boys encouragement.

Capt. Thomas S. Voss, U. S. Army Air Corps, commanding officer of Rodgers Field, assisted by putting on an excellent aerial exhibition. He had four planes in the air, piloted by Capt. Halsey R. Bazley, Lieut. John P. Morris, Lieut. Robert E. Dake and Lieut. Theodore Taney.

Lieut. Robert A. Laedlein furnished a surprise by disguising himself as a certain well known aviatrix, after due announcement and proceeded to take-off in his feminine attire. The crowd watched "her" breathlessly as "she" did all manner of things in the air. Then suddenly, from out of the ship hurtled a figure with skirts flying and arms waving wildly. Down it plunged with the crowd aghast, to discover later that it was only a dummy. This stunt gave the boys and spectators a great thrill.

### Varied Assortment of Models

The prizes in each contest consisted of a silver cup, carrying with it $25.00; second prize, $15.00; third $10.00; fourth $5.00; fifth a year's subscription to "AVIATION", donated by Major Gardner, and five consolation prizes of $2.00 each, also awarded in each contest. The cups were donated by Hon. James M. Magee for the winner of three contests in the duration section and by Col. Harry C. Fry, Jr., for the winner of three contests in the model section.

As a result of these contests, the juvenile airplane industry in Pittsburgh is booming. If there were any types of plane overlooked in the model section, it is not in the books today. There were spiffy Fokkers, to use the language of the boys,—peachy Handley-Pages, bombers, airships, and some types that neither Curtiss nor Wright know anything about. The youthful competitors impressed everyone with the fact that not only was it fun, but out of it they had gained an insight into aircraft construction that shamed many of the grown-ups. The Aero Club Committee which handled the contest gained a great deal of inspiration from the boys' knowledge and enthusiasm shown on the subject. The committee consisted of: John J. Feery, Chairman; Lester G. Graham; George E. Dickson; Edward W. Thomson; H. Frank Kinnard.

## Start Louisville-Cleveland Air Line

A daily passenger and express air line between Louisville, Ky. and Cleveland, Ohio, which will be operated by the Embry-Riddle Co. of Cincinnati, was inaugurated May 18. Intermediate stops will be at Cincinnati, Dayton, Columbus and Akron. Waco planes will be used exclusively.

A preliminary survey of the route has been under way throughout the past year. This survey has revealed definite possibilities in the route, if the scope of operations is wisely adjusted to meet the demands. All cities included are industrial centers and each has been educated to the possibilities of air transport. The physical characteristics of the territory embraced in the plans are suitable for safety in flying. The whole country is smooth and level, affording opportunity for intermediate landings under all conditions. All things considered, it is believed that wise business administration, coupled with the wide experience of the Embry-Riddle Co., will eventually result in profitable operation of the line.

Active preparation during the past month for the operation of the service has met with the greatest enthusiasm from chambers of commerce, civic organizations and newspapers all along the route. Business associates and friends of the Embry-Riddle Co. at points on the line have had great influence with local organizations in perfecting final arrangements for operation of the service. Especial credit is due Major Jack Berry of Cleveland, Dan Schryver of the Columbus Flying Service, Hugh S. Robbins of Akron and the Yellow Air Taxi Co. of Louisville, Ky. Every city has given strong assurance of the fullest cooperation and patronage. The use of municipal airports has been tendered, downtown offices have been provided and in many cases promises and contracts for express matter and passenger traffic have been given.

Miss Amy Pace of the Cincinnati Chamber of Commerce christened the new Waco which will be used "Miss Cincinnati," using a bottle of Ohio River water. Pending delivery of more Waco-10 planes, the service will be supplemented by Waco-9's. As more Waco-10's are delivered, they will be christened with names of the other cities on the route, with appropriate ceremonies at the places after which they are named.

Following the christening exercises the first flight of seven planes left Cincinnati for Louisville. The passengers included newspaper men and prominent citizens. The Brotherhood National Bank of Cincinnati sent a consignment of fruit to the President of the International Fruit Growers Association in Louisville.

The route is to be called "THE ER EXPRESS", "Er" being pronounced as "air." It is so named after the initials of T. Higbee Embry, president of the Embry-Riddle Co., and the initials of the company itself.

The flying personnel of the Embry-Riddle Co. has had wide experience in flying over the country embraced in the schedule. During the past year, their pilots flew more than 50,000 mi. cross-country over the very territory covered by the line. The complete route has been traversed scores of times in the course of routine work and each pilot knows his country like a book. The pilots who will fly the route are T. Higbee Embry, John Paul Riddle, Stanley C. Huffman, Raymond D. Harris and Duncan C. McCallum. These may be supplemented from time to time, as occasion demands, by pilots from Embry-Riddle sub-dealers in Ohio and Kentucky.

# Inter-American Commission Drafts Convention

## *To Be Submitted to Governing Board of the Pan American Union for Presentation to the Pan American Conference at Havana, Cuba*

THE Inter-American Commission on Commercial Aviation, which met in Washington, D. C., May 2-19, drafted a convention regulating commercial aviation in the American hemisphere, which will be submitted to the Governing Board of the Pan American Union and by it to the Pan American Conference, to be held in Havana, Cuba, during January, 1928. The delegates of the following countries participated in the drafting of the convention: Argentina, Bolivia, Chile, Columbia, Costa Rica, Cuba, Dominican Republic, Guatemala, Mexico, Panama, Peru, Salvador, United States, Uruguay and Venezuela.

The American delegation was outvoted on the proposal to permit arms and ammunition to be carried by craft with permission of the underlying state and also on the proposal to permit its nationals to fly over certain reserved military points, but to close the air above them to foreigners.

The convention applies exclusively to private aircraft, the contracting parties recognizing that every power has complete and exclusive sovereignty over the air space above its territory and territorial waters. Private aircraft is defined as all classes of aircraft with the exception of military aircraft, which embraces every aircraft commanded by persons in active military services or detailed for the purpose by competent authority. The second exception is aircraft exclusively employed in posts, customs, police and other services.

Each contracting state is to grant in time of peace freedom of passage above its territory to the private aircraft of the other contracting states, without distinction of nationality. Each contracting state has the right, for military reasons, or in the interests of public safety, to prohibit the aircraft of the other contracting states from flying over certain areas of its territory.

### Markings on International Travel Planes

Aircraft shall have the nationality of the state in which they are registered and the registration entry and the certificate of registration shall contain a description of the aircraft or state, the number or other mark of identification given by the constructor of the machine, the registry marks and the nationality, the name of the airport usually used and the full name and domicile of the owner, as well as the date of registration. Every aircraft engaged in international travel must carry a distinctive mark of its nationality, a certificate of registration, a certificate of airworthiness, a certificate of competency, list of passengers, with names, addresses and nationality (if passengers are carried), if carrying merchandise, the bills of lading and other custom documents, and log books.

The contracting states are to file every month with every other state and with the Pan American Union a copy of all registrations and all cancellations of registration. Every aircraft engaged in international travel must be provided with a certificate of airworthiness and the personnel on such craft must be provided with a certificate of competency. The carriage by aircraft of explosives and of arms and munitions of war is forbidden. Each state may prohibit or regulate the carriage or use by aircraft possessing the nationality of other contracting states of photographic apparatus.

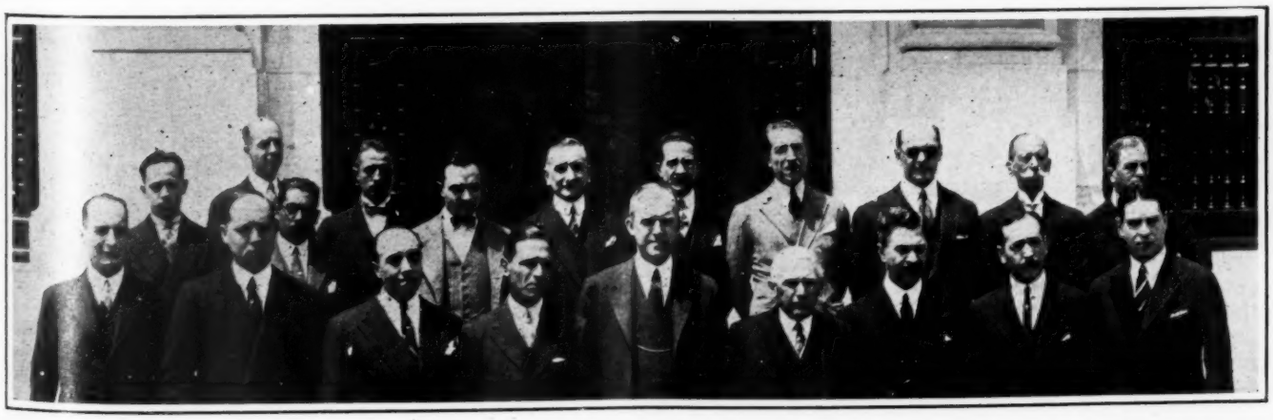
### Must Land When Signalled

No aircraft shall enter the air space of a foreign state, in which a landing is intended, without immediately landing at the nearest airport designated as a port of entry and prior to departure, every aircraft must obtain such clearance as is required by the laws of such state. If it is necessary for a plane to land at any point other than the designated one, the aircraft commander must notify the nearest state authority and wait at the point of landing until proper entry has been granted. Every aircraft shall be obliged to alight when ordered to do so by means of signals.

Postal aircraft and aircraft belonging to air transport companies regularly constituted and authorized may be free from the obligation of landing at a customs airport and authorized to land at certain inland airports appointed by the customs and police administration of each state.

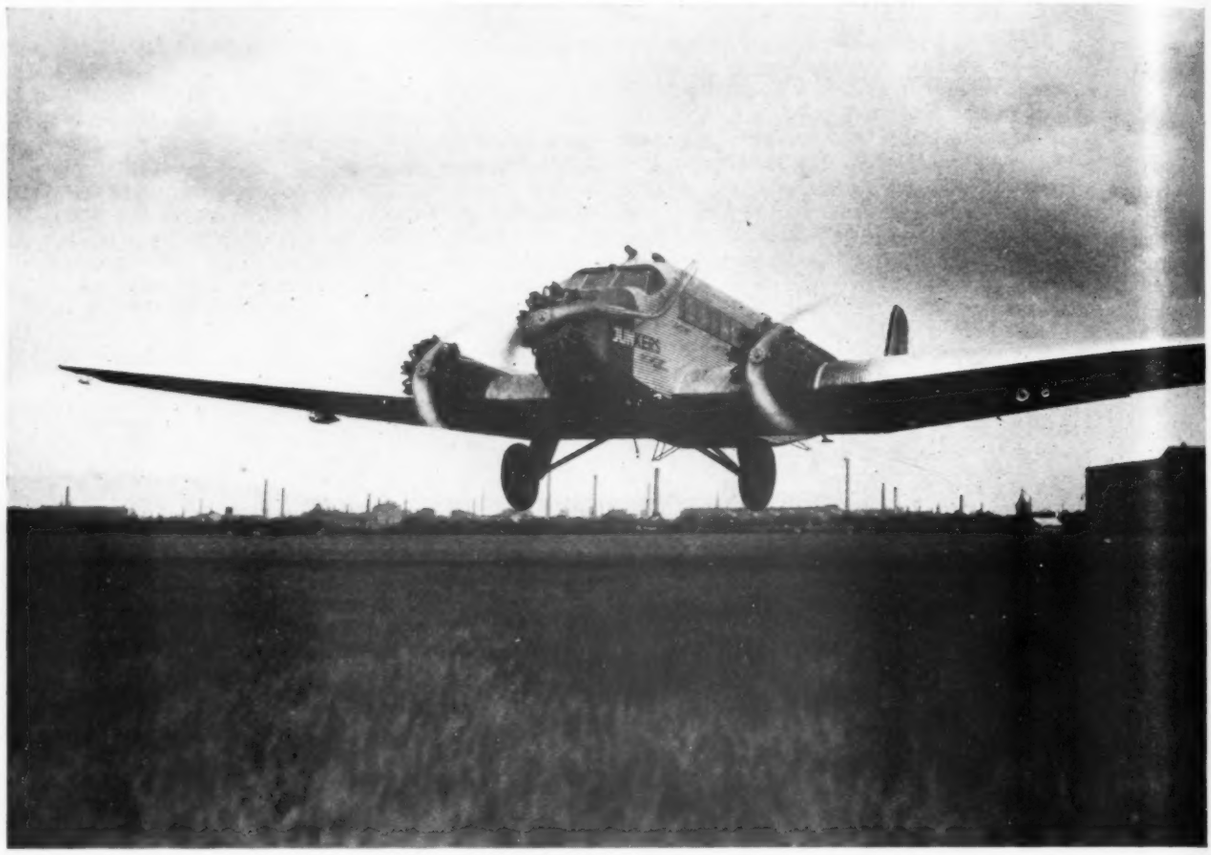
From the time of landing until the departure of a foreign aircraft, the authorities of a state visited shall have in all cases the right to visit and examine the aircraft and to verify all documents with which it must be provided. Each state shall have the right to establish reservations and restrictions in favor of its own national aircraft in regard to the commercial transportation of passengers and merchandise between points in its territory and to other renumerated aviation operations in its territory.

The aircraft of one contracting state shall not be compelled to pay other or higher airport charges than would be paid by national aircraft of the state visited and until special legislation is enacted, the rights and duties analogous to those of a captain of a merchant steamer, according to the laws of the state, shall be granted to the commander of the visiting plane. Preparations for damages caused to persons or property located in the underlying territory shall be governed by the laws of such state.



P & A Photo

Members of the Inter-American Commission on Commercial Aviation which met at Washington, D. C. Fourth from right in front row is Sec. of State Frank B. Kellogg; next to him is Asst. Sec. of Commerce for Aeronautics W. P. MacCracken, Jr., and eighth from right in rear row is J. L. Callan, president of Airships, Inc.



The new Junkers Passenger Monoplane G-31 taking off.

# Junkers Builds New Passenger Monoplane

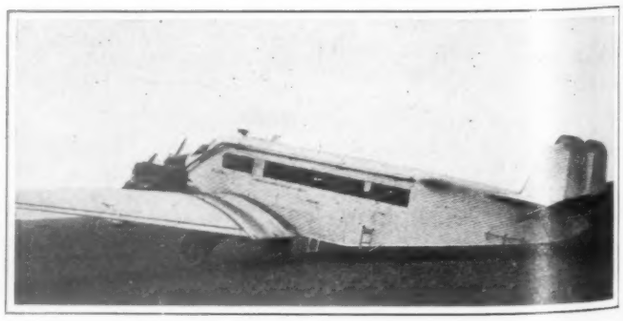
## *Has Three Engines, a 700 Mile Cruising Radius and Luxurious Passenger Accommodations for Fifteen People*

THE NEW Junkers passenger monoplane, type G31, represents the experience acquired in the research department, as well as that gained in the manufacture and operating branches of the Junkers Corporation. Like all other Junkers machines the G31 is of the unbraced, cantilever type, of all-metal duralumin construction, and fitted with three engines: one in the center and two on the wings. The total horsepower delivered by this power plant is 1200 hp. and the total weight of the machine loaded is 8½ tons. Fully loaded this plane has a cruising range of 700 mi. and a cruising speed of 125 m.p.h. The span of the wings is 103 ft. The length of the plane is 55 ft. and its height is 20 ft.

### Passenger Cabin is 7 ft. Wide

The cabin which is provided for the accommodation of the passengers is exceptionally spacious being almost 7 ft. wide. On account of the large dimensions of the cabin it has been possible to provide three freight compartments in this machine in which can be stored all freight and luggage so that no grips need to be carried by the passengers in the cabin.

Underneath the passenger cabin, on each side of the control tunnel, are two baggage compartments where even the largest wardrobe trunks can be safely stored. These compartments are electrically illuminated. In addition to the baggage compartments there is also a roomy freight compartment where heavy freight and mail can be stored, and this compartment is also used for housing an auxiliary power plant consisting of a small motor-driven 110 volt generator which supplies the electrical illumination when the plane is on the ground.



Side view of the Junkers G-31

The motor driving this generator also drives a compressor which provides compressed air for starting the engines on the ground. This electrical generating plant also supplies the electrical energy for the radio sending and receiving appara-

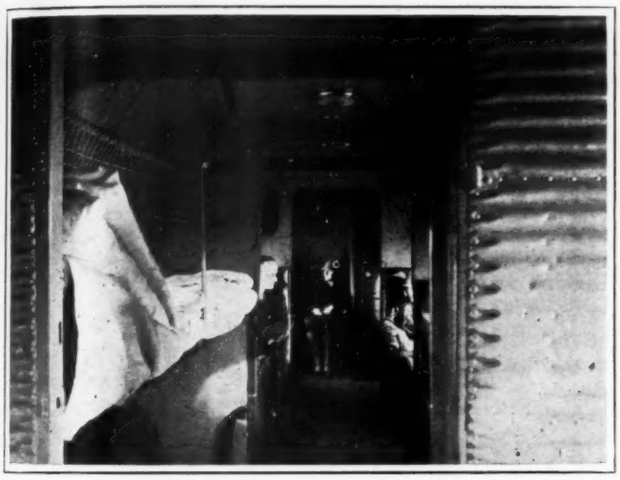
tus in addition to the operation of landing and running lights.

Of course, except when the machine is on the ground this electrical generating plant is driven by a propeller provided for this purpose. Two additional propellers are also provided for driving two centrifugal pumps, either one of them being sufficient for feeding the three engines—this is in addition to a hand-operated pump.

The longitudinal stability of this machine is rather remarkable. An adjustable stabilizer is used which allows the passengers to move about freely without disturbing the stability of the machine in flight. In the empannage the double rudders provided in this machine, will, in case that one of the engines should stop, still keep the plane under perfect control, only a slight pressure on the rudder pedals being needed for this purpose. Any slight unbalanced pressure on the rudders is easily compensated from the cockpit.

The tail-end of the fuselage is so roomy that there is a gangway leading to the extreme end of the tail, and the fuselage rear-end-fairing which carries the stern light is fitted with two handles which allow it to be easily detached for inspection purposes.

The double cockpit in front of the machine offers the exceptionally striking feature of being roomy and comfortable



View of passenger cabin of the G-31

for the pilots to sit in, and all the instruments are conveniently arranged in front of them.

The propellers used on this plane are of the Junkers type of metal forged construction. Everything in this plane is made of metal and even the landing-wheels are cast out of light metal. The only non-metal parts used in this plane are the pilots' seats and the tires, besides, of course, the cabin equipment.

The passenger cabin is divided into three inter-communicating compartments. The first has two beds of the same dimensions as ordinary sleeping car berths, and has two very comfortable club chairs. The second has four club chairs and the third has a sofa which seats two persons, and a club chair. A door opening in this third compartment leads to the toilet.

### Compartments Brightly Illuminated

Each compartment is provided with efficient ventilators heated by the circulation of warm air, and is brightly illuminated at night. Large windows on either side of the cabin provide an unobstructed view of the panorama for the passengers, and plenty of sunlight. These windows can be opened by means of a cranking device which allows the glass panes to slide longitudinally in their frames. In order to provide for the maximum comfort of the passengers the exhaust pipes of the engines are led all the way back, past the rear of the cabin, thus diminishing the noise of the engines considerably. Seating accommodations are provided for eleven passengers, and four additional chairs can be placed in the interior of the cabin, thus providing very comfortable accommodation for fifteen passengers.

In designing the passenger cabin of this machine, the comfort of the passenger has been given first consideration, the idea being to give them plenty of room to move around, and comfortable big chairs to sit in. Moreover, by changing the seats, more passengers can be accommodated. This aircraft was designed with a view directed mainly toward de luxe transportation and night flying for passenger service. As a freight-carrying machine this type is exceptionally good.

The Junkers Corp. of America has recently opened offices at 342 Madison Ave., New York City.

## Air Mail Stamps in Honor of Lindbergh

Postmaster General New has announced that a special air mail stamp, of ten-cent denomination, be issued in honor of Capt. Charles A. Lindbergh and his epoch-making flight across the Atlantic.

The Postmaster General said in making public his decision: "The Post Office Department has neither awards or medals nor authority for bestowing decorations with which to mark the appreciation and respect we hold for our air mail pilot who has made such a notable contribution to the science of aviation. The only appropriate thing we can do is to issue a stamp in his honor."

The new stamp will not carry a portrait of Captain Lindbergh since the law prohibits the use of the portrait of a living man upon a stamp. It will have for its central design, however, a representation of his plane "The Spirit of St. Louis," which so successfully carried him on his journey across the sea, and which to Lindbergh was the other half of "we."

The new stamp will displace the regular ten-cent air mail stamp design now issued to postmasters and will be available for issuance within a short time. They will be placed on sale first at the St. Louis, Mo., post office on the date of the Lindbergh celebration in that city. On the same day they will be available for the benefit of stamp collectors at the Philatelic Agency at Washington, and to other offices throughout the country as fast as production will permit.

Across the top of the stamp in white Roman letters will be the words "United States Postage" with the words "Lindbergh-Air Mail" directly beneath. At the left of the portrait of the airship will appear the coast line of the North American continent with that of Europe on the right side, with a dotted line depicting the course of the flight, beginning with the word "New York" and ending with the word "Paris". At the bottom of the stamp in shaded letters is the word "Cents" and in both lower corners are the white numerals "10". The stamp will be printed in blue, the color of the present 10-cent air mail stamp, and the same size 75/100 by 1.84/100 inches.

## Exploration Flight Through Eastern Siberia

Russian journals report a recent exploration flight through Eastern Siberia between Irkutsk and Bodavio with a Russian Junkers seaplane. This difficult stretch of flying territory follows the Lena River along the Bical Plateau touching Schialow Kirirensk and Wittin. It is intended to establish a regular passenger, freight and mail air traffic along this route which is to connect Irkutsk and Jakutsk and thus tap the gold fields of the Aldon territory.

## Max Henne Joins Pacific Air Transport

Max Henne, former air mail pilot, has been appointed chief mechanic of the Pacific Air Transport. Mr. Henne until a short time ago was chief mechanic for the government air mail at Concord Field, near San Francisco. He has been engaged in aviation work since 1909. The position he will fill is one, created to relieve Grover Tyler, superintendent at San Francisco for the company, of some of his responsibilities and allow him to broaden his activities.

Start of the National Balloon Race at Akron, O., as seen from the air.

# Van Orman Wins National Balloon Race

## *Sails with aide, W. W. Morton, to Beach near Bar Harbor, Me. E. J. Hill is Second and Captain Kepner Captures Third Place*

IN WINNING the National Balloon Race, held on Memorial Day at Akron, O., for the third time, Ward T. Van Orman gained permanent possession of the Litchfield Cup. Van Orman had as his aide W. W. Morton and together they piloted the Goodyear Rubber Co. entry from Akron to a sandy beach near Bar Harbor, Me., a distance of some 715 mi. E. J. Hill and his aide A. E. Schlosser in the Detroit Flying Club No. 3 captured second prize in coming to earth at Showhegan, Me. after they had covered about 665 mi. Third honors went to Captain Kepner and his aide Lieut. W. O. Eareckson in the Army No. 3 which came to earth at Biddeford after a flight of about 610 mi.

The three leading contestants will have the privilege of representing the United States in the Gordon Bennett International Race which, on account of Van Orman's victory last year, is to be held this year from Denver, Colo., on Sept. 10. A strong effort will of course be made to keep the Cup in this country for another year.

### Largest Entry List on Record

Of incidental importance was the fact that the race this year drew the largest entry list that has ever taken part in a race in this country. Fifteen contestants took part, including four Army, three Navy, and eight civilian. Secretary Warner was out to see the Navy men off, and General Patrick honored the Army pilots with his presence.

As has been customary in the National Race for the last few years, the balloons were limted to 35,000 cu. ft. capacity, which makes the race available for individual pilots of even comparatively limited means.

The race management, under rather difficult conditions, was without doubt the most perfect yet seen in this country, and the entire program showed with how much care and thought the preparations had been made. Herbert Maxson served as Manager of the local committee, ably assisted by V. N. Braden; Carl Schory of the National Aeronautic As-

The winner—Ward T. Van Orman.

sociation contest committee was Referee while Col. C. deF. Chandler was Starter; Captain Johnson of the Army handled the weigh-off,—to mention but a few of the many who cooperated toward the success of the event.

An article describing the meteorological features of the race and the routes followed by the leading contestants will appear in the June 20 issue of AVIATION.

## Guggenheim School Officially Opened

The new $500,000 building of the Daniel Guggenheim School of Aeronautics at New York University was officially opened on Saturday June 4, 1927 when Daniel Guggenheim, founder, presented it to Chancellor Brown who accepted it on behalf of the University.

Mr. Guggenheim, Chancellor Brown, Dean Collins P. Bliss of the College of Engineering, and Assistant Secretary of Commerce William P. MacCracken, Jr., in charge of aviation in that department, were generous in their praise of Lindbergh and other trans-Atlantic fliers including Nungesser and Coli. Mr. Guggenheim asserted that the future of aviation was in the hands of the country's youth, and cited Lindbergh as an illustration of what aviation holds for the ambitious youth.

Mr. Guggenheim disclosed that it was through his son, Harry, an aviator in France in the World War, that he became interested in aviation and particularly in the foundation of the Daniel Guggenheim School of Aeronautics. Harry Guggenheim was present at the opening of the building and pressed an electric button that set the big wind-tunnel in operation.

### Mr. Guggenheim Pleased With School

Satisfaction with the progress of the school was expressed by the founder who said he had been informed that the enrollment was almost twice that of any other engineering department of the university, and that he was gratified that the trustees of the fund had made grants to the Massachusetts Institute of Technology, University of Michigan, Leland Stanford Junior University and California Institute of Technology to assist in creating aeronautical instruction centers.

"In addition, I understand that four other universities in this country have established either chairs or departments of aeronautics, where elective studies in aeronautics may be taken by engineering students," he added. "So, to my mind, a wonderful start has been made along right lines looking to an expanded program in the airplane industry. Including the above universities, I understand that there are in this country a total of twenty-three universities and colleges offering special courses in aeronautical work.

"Since my first interest in this School of Aeronautics my thoughts have been largely devoted to this subject and I have become tremendously and enthusiastically interested in present day developments and their far-reaching effects.

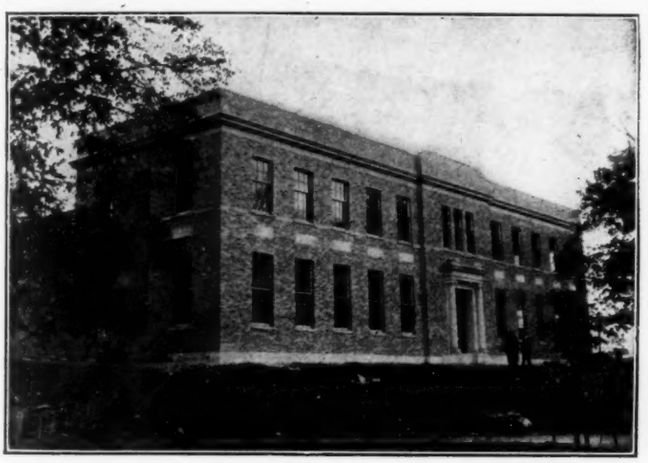
"There has never been a scintilla of doubt in my mind as to the future possibilities and even probabilities for the advancement of aviation, and the marvelous flight recently made by Captain Lindbergh should remove beyond question of preadventure any pessimistic tendency toward the subject. Frequently I am asked by young men who wish to take up the science of aeronautics what their chances are of securing positions after graduation.

### Telegram From Orville Wright

"It is my belief that any youth who pursues a scientific course and is capable enough to complete it, leading to the degree of an aeronautical engineer, should find little difficulty in securing his place in the industry, and I look upon Captain Lindbergh as a fair example of what a young man of ambition, determination, resourcefulness and skill is able to accomplish."

Dean Bliss read a telegram from Orville Wright, Chairman of the Advisory Committee of the School of Aeronautics, which read: "Regret I cannot be present at the opening of the new building and the inspection of the laboratories of the Daniel Guggenheim School of Aeronautics. Please express to Mr. Guggenheim my personal thanks for what he has done for aviation. I know the splendid equipment he has furnished will be used by the university with the greatest profit to education."

Following the opening, Mr. Guggenheim and the guests inspected the building, beginning with the wind-tunnel, 110 ft. long and 55 ft. wide, in which air is driven at a velocity of



The Guggenheim School of Aeronautics, N. Y. University

100 miles an hour by an eight-blade aluminum propeller, 14 feet in diameter and propelled by a 300-horsepower motor.

Prominent men from all branches of the science of aviation were on hand to admire and praise the man who has done so much for the field of aviation. Chancellor Brown said that Mr. Guggenheim was the foster-father of commercial aviation in this country and that he had touched the heart of the world by sending his expedition to search for those adventurous French fliers, Nungesser and Coli, in the wild regions of Newfoundland.

Professor Alexander Klemin is in charge of the new school. At present it has an enrollment of forty-five students, but for next year the department has a greater enrollment than any other individual section of the engineering college.

## Junker Freight Plane Sets Two More Records

On May 11 two more records were established by the Junkers organization in Dessau, Germany, with their W-34 freight carrier type of aircraft equipped with Bristol-Jupiter motor, 480 hp. piloted by Herr Jueterbock.

The first was with a useful load of 1272 lb. over a course of 311 mi., the average speed reached was 120.6 m.p.h. The second was over a course of 622 mi. and with 1272 lb. useful load, the average speed of 112.5 m.p.h. was reached.

The previous record established with a machine of another manufacturer over a 622 mi. course and without useful load was less than 112.5 m.p.h.

## N.A.C.A. Publishes Report on Ground Effect

The National Advisory Committee for Aeronautics has recently published Report No. 265, A Full-Scale Investigation of Ground Effect by Elliott G. Reid. The report describes full flight tests which were made with a Vought VE 7 airplane to determine the effects of flying close to the ground. It is found that the drag of an airplane is materially reduced upon approaching the ground and that the reduction may be satisfactorily calculated according to theoretical formulas. Several aspects of ground effect which have had much discussion are explained. Copies of this report may be obtained upon application to the National Advisory Committee for Aeronautics, Washington, D. C.

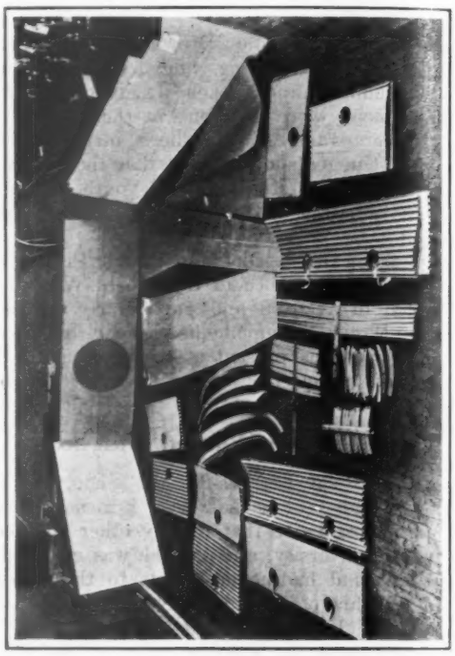
# The Anodic Oxidation Treatment of Duralumin

By LIEUT. COMDR. WM. NELSON (CC), U. S. N.

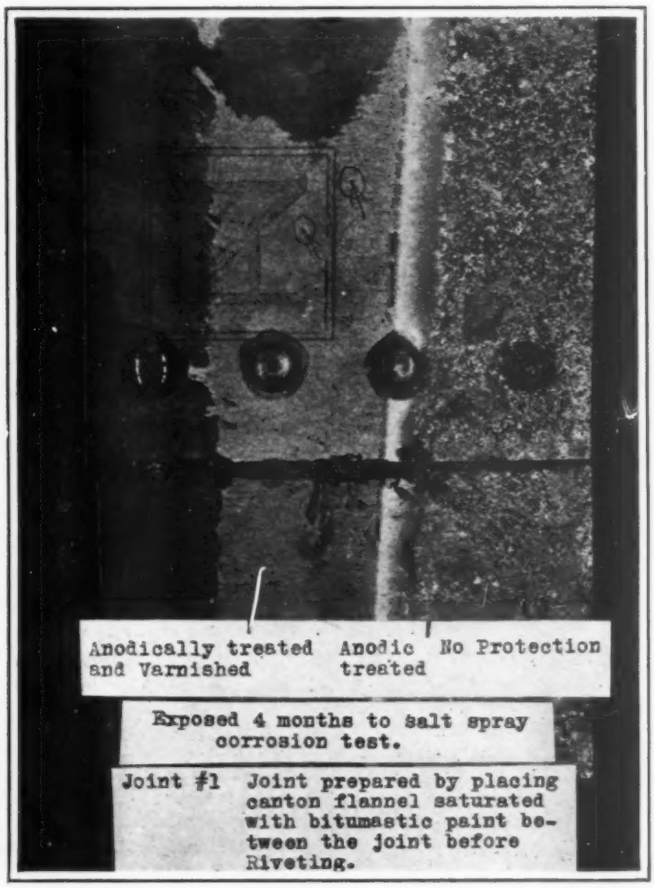
DURALUMIN as a structural material for aircraft is of little use to the airplane industry unless suitable means for protecting the metal against corrosion are followed. Of the many methods that have been tried, the electro-chemical means has proved to be particularly enticing. Unfortunately, electro-plating aluminum alloys is exceedingly difficult and even after one has done a job with some degree of success the results, as far as the prevention of corrosion is concerned, are disappointing. It has been noted in some cases of electro-plating that corrosion actually increased over what could normally be expected in a corrosive medium due to the electrolytic action between the plate and the base metal. But aside from the plating schemes, considerable work has been done on building up the oxide film on aluminum and duralumin by electro-chemical and straight chemical means as an added protection against corrosion. Perhaps the most successful of these is the anodic oxidation treatment done by electro-chemical means developed first in England.

The anodic oxidation treatment for aluminum alloys consists of oxidizing the surface of the part by making it the anode in a chromic acid solution through which electric current is directed. As can be expected, although small, there is an actual loss in weight due apparently to the loss of some of the base metal. The film produced is very very thin, and adheres to the base metal so firmly that it can be considered a part of the piece. The anodic oxidation treatment removes the polished surface ordinarily seen on rolled duralumin giving the material a light gray velvety appearance. This treatment renders the aluminum very resistant to corrosive influences; but the full benefit of this type of oxidized surface is not obtained without the use of a final paint or varnish finish as will be pointed out later on.

It is perhaps possible to anodically treat the greater number of the aluminum alloys which are high in aluminum, but the practical application has been limited to those containing less than 5 per cent of copper. High current consumption has precluded its adoption for the aluminum-zinc and aluminum-silicon alloys, whereas the low breakdown voltage precludes its use where more than 5 percent copper exists. The presence of isolated steel, brass or other foreign metals in the aluminum part being oxidized cause complete failure to produce an anodically oxidized surface on the aluminum. When steel is present in the part being treated, the current will run freely without the usual increase in voltage. Attempts to treat a duralumin cowling with a steel wire in the beading were entirely unsuccessful. High copper alloys, such as brass and bronze, in the bath with aluminum are dissolved by the operation. However, since the aircraft industry is primarily concerned with aluminum and duralumin and since these come well within the range of the limits found, the anodic oxidation process is of immense practical benefit there.



Miscellaneous duralumin and aluminum aircraft parts, which have been successfully treated anodically.


Anodically treated and Varnished
Anodic treated
No Protection
Exposed 4 months to salt spray corrosion test.
Joint #1 Joint prepared by placing canton flannel saturated with bitumastic paint between the joint before Riveting.

Beneficial effects of anodic treatment and varnish on duralumin against salt spray corrosion.

## Semi-enclosed Objects Treated Equally Well

It makes little difference what shape the material to be treated takes insofar as the formation of the film is concerned. The film forms wherever the liquid of the bath comes into free contact with the surface of the part so that tubes and other semi-enclosed objects are treated equally well on the inside surfaces as on the outside surfaces. This feature enters into the treatment of assemblies as being of major importance. Pores and cracks in the aluminum ordinarily very minute are also treated provided the liquid enters these spaces. The value of this is readily recognized in view of the concentration of corrosion in pores, scratches, cracks, etc. when the metal, unprotected, is subjected to a corrosive influence.

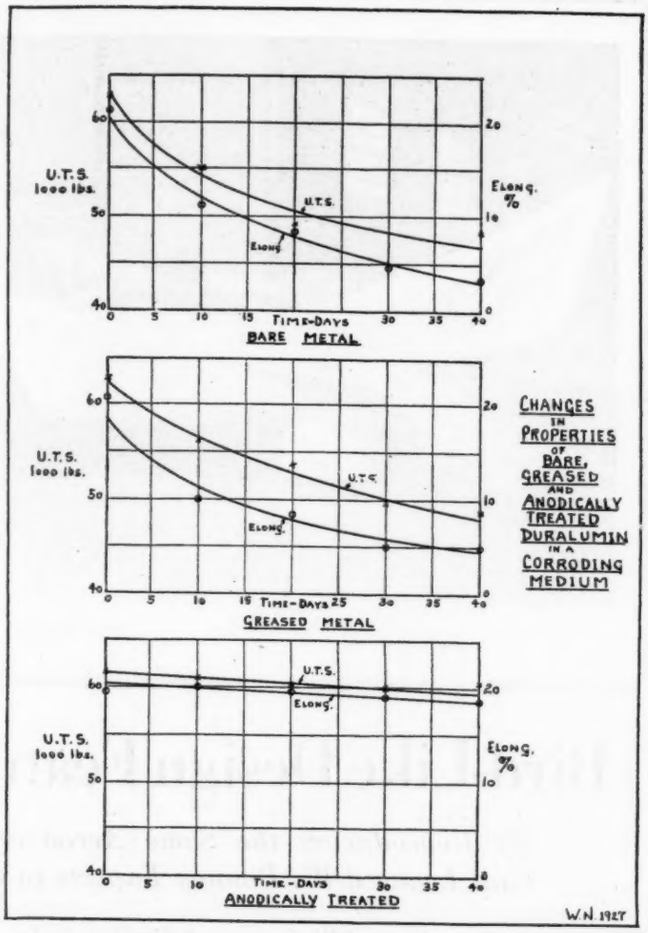
The current consumption during the operation of treating a piece of aluminum or duralumin is dependent on the area

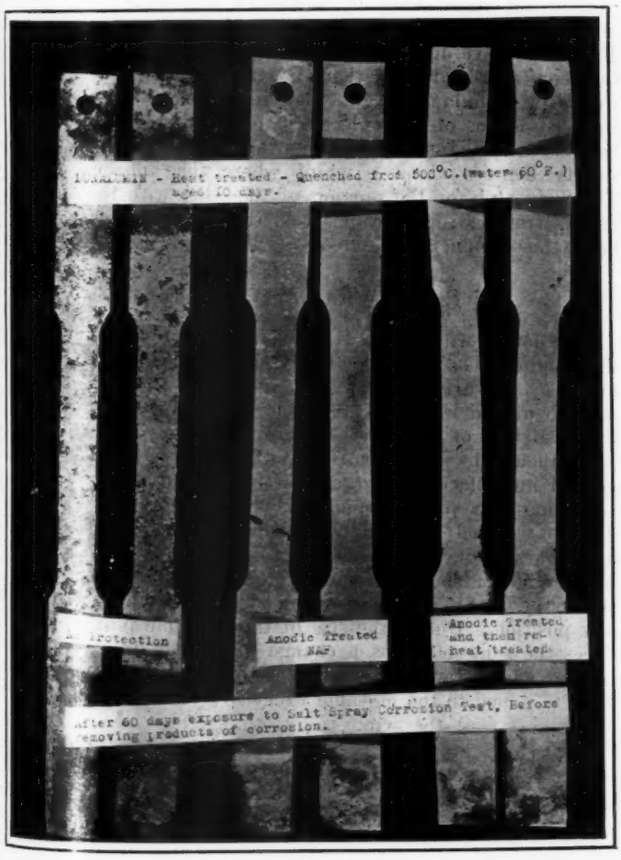
of the exposed surface of the piece. Consequently sand blasting and other etching processes cause exceedingly high currents to flow compared to that produced with a similar volume of plain material. Economy, therefore, renders it advisable to avoid any unnecessary etching of the surface. Corroded duralumin which is being used in any reconditioning job should be cleaned by some other process than blasting or etching, if it is to be anodically treated. It is believed that some of the pits in a corroded piece of metal are not satisfactorily treated by the process due to the products of corrosion in such pits, so it is encumbent on those looking for results to insure entirely clean surfaces.

### Disadvantage in Treating Individual Pieces

The size of the tank of the anodic apparatus is one limit on the size of the pieces that can be treated, the other is the degree with which subsequent finishes can be applied. An assembled rib made up of tubes can be treated anodically very readily, but the problem of applying varnish or paint to the insides of the tubes after the treatment may be difficult. In such cases it appears advisable to anodically treat the individual parts. The disadvantage of treating individual parts lies in the fact that the rivets miss the oxide film. It is, therefore, advisable to treat as complete assemblies as is possible provided a relatively complete finish of paint or varnish can be applied afterwards. In an assembly which is to be anodically oxidized, no varnish or compounds should be applied to the joints during assembly since the anodic bath tends to raise the compound and render it worthless. Tests on anodically treated joints show that the film is produced to a point very close to the rivets on the faying surfaces. However, parts which are to be assembled to produce watertight joints should be anodically treated prior to assembly.

Good welds in aluminum and duralumin accept the anodic treatment very readily, producing a film over the weld which is as good as that on the ordinary surface. Welds poorly made do not take the anodic oxide efficiently. In such cases included flux is burned out and the film is discontinuous. Welded aluminum tanks which have withstood the ordinary tightness tests and which have then been anodically treated have failed on retest due apparently to the washing out of the flux and other foreign substances. Incidentally the anodic treatment is an excellent test of the value of a weld in aluminum.





Anodic treated
Anodic treated and then re-heat treated
After 60 days exposure to salt spray Corrosion Test. Before removing products of corrosion.

Tensile specimens subjected to the salt spray to determine the effects on physical properties of duralumin when anodically treated and corroded.

The anodic oxidation treatment is not known to affect the heat treatment of duralumin nor does subsequent heat treatment affect the oxidation particularly, provided there is no working of the metal. This feature should not enter into any problems of the aircraft constructors, however, for in most cases the oxidation usually comes after the working and heat treatment are completed.

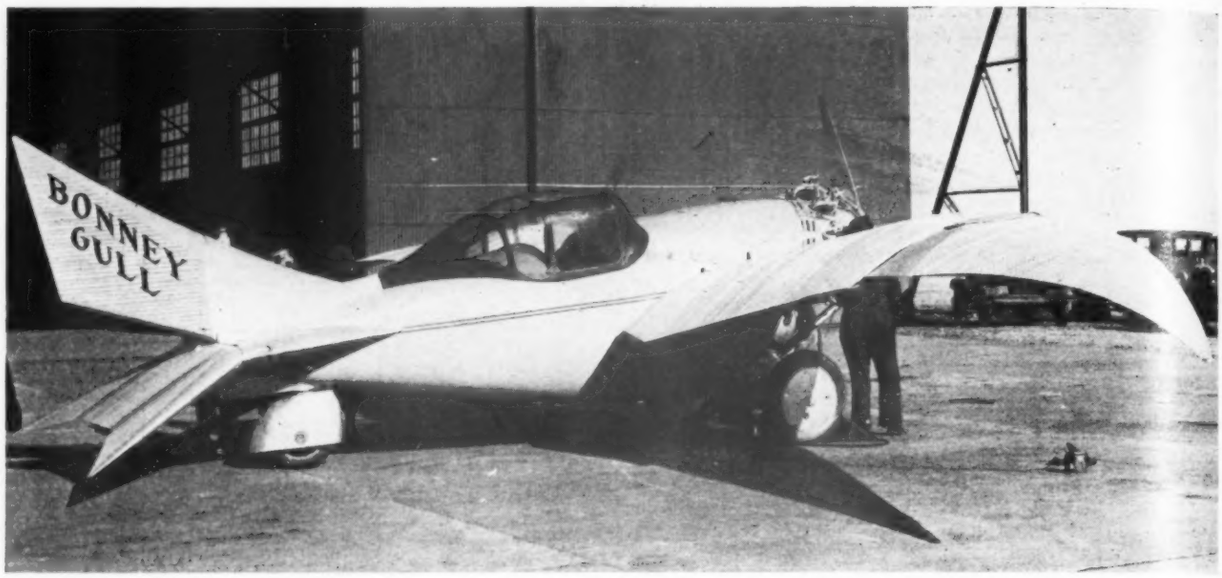
### Treatment Carriad Out in Steel Tank

The anodic treatment is carried out in a steel tank of suitable capacity, the electrolytic being a dilute solution of chromic acid. The tank is so arranged that the temperature of the bath can be controlled, and so that the electrolyte is continuously agitated. Various means of heating, cooling and agitating the solution are practicable. The tank being the cathode in the process, it is necessary to provide supports for the anodes or the pieces to be treated.

There is apparently no change in the bath due to operation excepting the evaporation of water. This evaporation is taken care of by the addition of water at periodic intervals so that the concentration of the solution does not change materially. It is considered advisable, however, to check the concentration of the solution at intervals to insure correct conditions. Also, sediment and dirt should not be allowed to accumulate in the bottom of the tank too long.

A motor generator set supplies the electrical power. The generator should be shunt wound and should be fitted with a variable resistance in the field so that the voltage can be

(*Cont. on page* 1315)




The Bonney "Seagull".

# Bird-Like Design Features Bonney "Seagull"

***By Reproducing the Same Aerodynamic Characteristics as those of the Gull Leonard W. Bonney Expects to Give his Plane a Similar Performance***

FOUR YEAS ago Leonard W. Bonney, of Flushing, L. I., conceived the idea of building an airplane modeled after the form of a bird and in that way to reproduce the enviable characteristics of bird flight. He took as his specimen the seagull well known for its ability to glide long distances, and by reproducing the same aerodynamic characteristics as those of the gull Mr. Bonney expects to give his plane a performance that approaches that of a bird.

The Bonney "Seagull", as it is called, is now ready to be test flighted at Mitchel Field, L. I., N. Y. It is exceptionally well built of all-metal construction, being powered with a nine cylinder radial engine built by Mr. Bonney. The fuselage is well faired with a comfortable, covered cockpit fitting into the streamline form very nicely. Similar to a bird the wings can change their angle of incidence, angle of decalage, or can be folded while in flight. The area of the elevator can be easily changed from the cockpit.

### Independent Movement of Wing Sections

When Mr. Bonney decided on the seagull as a model, a seagull was caught, killed, and a plaster cast made of its wings and body. The wings and body were drawn to scale, and from these drawings the general dimensions of the plane were determined. The fuselage of the Bonney Seagull is almost an exact reproduction of the body of a seagull. After a series of wind-tunnel experiments at Massachusetts Institute of Technology and at the Daniel Guggenheim School of Aeronautics, New York University it was decided to make the wing section a combination of a modified Gottingen 387 and of dimensions from the wing of the gull. In plan and taper the wings closely resemble those of the bird. The center of pressure movement is small, being only ten or eleven inches.

Sections of the wings can be moved independent of the rest of the wing. The mechanism for all the controls is worked out ingeniously by means of bell-cranks and levers or by a hydrostatic mechanism developed by Mr. Bonney. The wings have dihedral of ten degrees up to a point at half the semi-span and from there a gradual anhedral out to the wing tip. Similar to a gull the wings come to a point at the tip. By means of a simple mechanism, this tip can be moved backward and forward through approximately eighteen or twenty degrees about a point where the anhedral begins. The wing stub, or the portion of the wing with the dihedral, has its trailing edge flexible from the mid-point of the chord back, thus producing an effective aileron close to the fuselage.

### Entire Wing of Duralumin

The entire wing is built of duralumin. There are three duralumin tubes that perform the functions of the spars and they are arranged in a triangle, with two at the upper surface of the wing and the other mid-way between, at the lower surface of the wing. The arrangement of the tubes is strengthened by having a Warren trussing connecting them, riveted into place. There are lateral formers or ribs to give the wing the proper camber. The wing is covered with .015 in. ribbed duralumin sheeting riveted to reenforcing angle bars of duralumin. The trailing half of the wing moves up and down similar to an aileron. This movement is actuated by a bell crank so arranged that it can be locked in any position. Due to the size of this movable portion it produces the same effect as a change in camber, thus producing a high and a low speed wing section. This section of the wing is joined to the movable wing tip by a flat flexible metal coupling giving the wing a smooth surface from the wing stub to the tip.

It is stated that the angle of incidence or angle of dihedral can be changed while in flight. This is controlled by a hydrostatic mechanism operated from the cockpit. The upper two tubes of each wing spar are connected together by two steel

tubes, crossing the fuselage and the connections being flexible. Each lower duralumin tube in the wing is connected to a piston of the hydrostatic mechanism. The cylinders around these two pistons are linked together at a point at the bottom of the fuselage. By moving the pistons in the cylinder the dihedral angle of the wings can be changed. The two steel tubes connecting the upper wing tubes and crossing the fuselage are connected to another steel tube crossing the fuselage. This third tube is also connected to the point at the bottom of the fuselage where the cylinders are linked together. It is this tube that supports the entire wing structure, consequently it is attached to the fuselage. This is the only place where the wings are attached to the fuselage. As this tube can be rotated about its axis the angle of incidence of the wings can be changed. The wings are folded by rotating them through ninety degrees (changing angle of incidence) and increasing the dihedral until the wings are back against the fuselage. This entire mechanism, called the center section, is built of welded steel tubing.

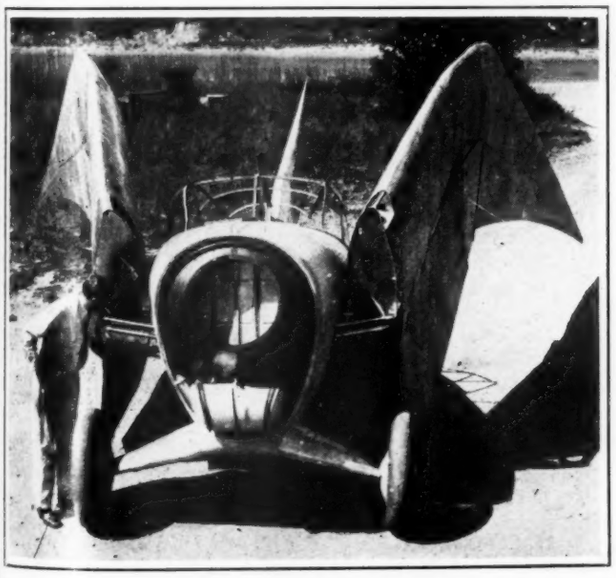
## Dual Side by Side Control

Similar to a bird the fuselage is fairly large being very wide and deep. It is of conventional monocoque construction, plywood and fabric covered, finished in yellow pigmented dope. The forward part of the fuselage being taken up by the gasoline tank at the top and by the center section and wing control below the tank.

The spacious cockpit is modeled after the interior of an automobile. The seats are heavily upholstered in leather. There is plenty of room for luggage, tools etc. The cockpit is faired in by a transparent covering, giving a very large angle of vision.

The plane is equipped with dual side by side control. All the controls are arranged in the conventional way. The cockpit and wings are fitted with electric lights.

All the tail surfaces are of very thick section. The vertical fin and the rudder are quite conventional, unless it may be said that the rudder shape is radical. The vertical tail area is increased by the fairing over the tail wheel. By sliding part of the elevator tips into the center part of the elevator the elevator area can be changed, thus producing stability



Underwood

Plane with wings folded and no engine.

for different conditions of balance, without changing the horizontal stabilizer setting. This is controlled by a cable from the cockpit.

The landing gear is of cantilever construction, having rubber discs in compression to absorb the shock. The steel tubes used in the landing gear are covered over with dural sheeting in such a way as to give an airfoil section. It is estimated that the lift of this area will carry the weight of the landing gear. Hydrostatic brakes are employed in such a way that either one or both wheels may be locked. The tail skid consists of a small, rubber tired wheel. The rubber tire is considered sufficient to absorb the shock. The upper half of this wheel is covered with sheet duralumin fairing. As the wheel moves with the rudder this fairing tends to increase the rudder area.

The engine was designed by Mr. Bonney. It is a nine cylinder radial, air-cooled engine calculated to develop 180 hp. at 1600 r.p.m. The cylinders are of steel aluminum heads.

Leonard W. Bonney Designer and builder of the Bonney "Seagull". The engine is of his design also.

The valve seats, spark-plug bushing, and hold-on bolts are all tapered. The engine is equipped with dual ignition. There is an expansion compensator on the rocker-arm purchase.

Mr. Bonney claims that the efficiency of the engine is increased by the use of a rotary fuel impeller, acting as a modified supercharger. This rotary impeller is driven at four times engine speed by a set of planetary gears. An injector starter is used. This starter is equipped with a tank large enough for five or six starts. A gravity fuel system is employed. The tanks are of welded aluminum. The gasoline and oil tanks are of sixty and ten gallons respectively. A Curtiss Reed propeller is used.

A close inspection of the plane will bring out one pertinent fact. Every possible effort has been made to make the plane as mechanically perfect as possible. The workmanship is excellent. As has been said before, wind tunnel tests have been made on models and there is every indication that the experiment is going to prove a success. At present Mr. Bonney is having a little trouble with his engine due to carburetion. It is expected that first flight tests will be made within a few days.

The general specifications according to Mr. Bonney are:

| | |
|---|---|
| Weight | 2000 lb. |
| Span | 40 ft. 3 in. |
| Mean chord | 5 ft. 3 in. |
| Wing area | 174 sq. ft. |
| Landing gear area | 18 sq. ft. |
| Wing tip area | 68 sq. ft. |
| Horizontal stabilizer area | 9 sq. ft. |
| Elevator area extended | 18 sq. ft. |
| Elevator area contracted | 13 sq. ft. |
| Rudder area | 8 sq. ft. |
| Vertical fin area | 4 sq. ft. |
| Tread | 6 ft. 6 in. |
| Length | 21 ft. 7 in. |
| Height | 7 ft. 3 in. |
| Width with wings folded back | 13 ft. 6 in. |
| Wing loading | 11.5 lb./sq. ft. |
| Power loading | 11.1 lb./hp. |

Predicted performance:

| | |
|---|---|
| High speed | 140 m.p.h. |
| Landing speed (max.) | 40 m.p.h. |

## American Airplanes Fly 23,000,000 Miles

More than 23,000,000 miles were flown by civil and commercial aircraft in the United States during 1926. In addition to this mileage of heavier-than-air craft it is estimated that a total of 37,500 miles were flown by lighter-than-air craft during the year.

Reports from scheduled air transport operators and operators engaged in sightseeing, exhibition, advertising, photography, crop dusting and other branches of aerial work indicate that approximately 23,310,355 mi. were traveled by the flights of 1,536 planes during the past year, using an average speed of 80 m.p.h. as a basis of comparison. If the Army, Navy and Coast Guard flying time were to be added to this figure the total American air mileage for heavier-than-air craft would be 48,586,492 miles.

Flying over eighteen regular airways, 194 planes maintained a scheduled mileage of 4,474,772 miles in 1926. Reports from all air operators indicate that 94,353 passengers were carried on planes free of charge during the year. The number of paying passengers transported totaled 675,567. The total number of hours flown reported was 234,313 and pay freight carried amounted to 418,986 lb. Reports to the Department of Commerce indicate that 4,460 students were given training in aviation in 1926.

## Whaling Fleets Use Planes for Spotting

Airplanes for spotting whales is the latest device employed by the whaling fleets in the Pacific in order to increase their catches. Captain LeMarquand, probably the foremost Pacific whaler today, who owns a fleet of steamers and several land stations along the coast, is a believer in the airplane as a means of increasing the catches. He will have an airplane almost constantly on observation during the whaling season. The plane will fly over the favorite whaling ground west of Vancouver Island, seventy-five to one hundred miles out and keep the shore stations advised. Spotting a whale from an airplane is similar to spotting a submarine. In clear weather a whale is visible up to twenty-five miles. In spite of the declining catch in the North Pacific, the whalers, by the use of the airplane, expect to bring back the seasons catches to a figure approaching that of a year ago.

## Cairo-Cape Town Flight Ends Successfully

The flight of the Royal Air Force from Cairo, Egypt, to Cape Town, South Africa, and back, a distance of 11,000 miles, ended May 22, when four planes, under the command of Air Commodore Samson, returned safely to the Heliopolis airdrome, at Cairo.

The flight, which began March 30, kept entirely to prearranged schedule. The engines ran perfectly and airdrome and landing fields throughout the route were found in excellent condition.

One of the novelties of the flight was the sighting of four herds of elephants. At one time the planes flew low, counting 150 elephants, which stampeded at the approach of the machines.

## Curtiss Pilot Goes to South America

W. H., "Mac," McMullen, one of the best-known pilots of the Curtiss Flying Service at Garden City, sailed recently for South America to demonstrate Curtiss "Hawk" pursuit planes in Chile. Ten of these machines are now in Santiago, Chile, and McMullen will have charge of their assembly and flight tests. He is following in the footsteps of Lieutenants Jimmy Doolittle and George Cuddihy, who thrilled all South America last winter with their remarkable flights over the Andes in the tiny "Hawk."

McMullen is no stranger in South America, having spent a year there in 1920, demonstrating Curtiss products in the Argentine, and it was partly because of this experience that he was selected for his present work in Chile.

McMullen has been flying for the Curtiss Company since 1919 and has earned the reputation of being one of the best photographic and mapping pilots in the country. Perhaps his outstanding achievement in this respect was the mapping of more than three thousand square miles of the jungle-like Florida Everglades, from an altitude of ten thousand feet. He has also mapped all of Westchester and Nassau Counties in New York, made aerial surveys for the extension of high tension power lines in Virginia and photographed several large cities, such as Greater New York, Syracuse, N. Y. and St. Petersburg, Florida.

## Characteristics of Propeller Sections

Report No. 259, describing "Characteristics of Propeller Sections Tested in the Variable Density Wind Tunnel", compiled by Eastman N. Jacobs, for the National Advisory Committee for Aeronautics, deals with tests that were carried out in the variable density wind tunnel of the National Advisory Committee for Aeronautics on six airfoil sections used by the Bureau of Aeronautics as propeller sections. The sections were tested at pressures of 1 and 20 atmospheres corresponding to Reynolds Numbers of about 170,000 and 3,500,000. The results obtained, besides providing data for the design of propellers, should be of special interest because of the opportunity afforded for the study of scale effect on a family of airfoil sections having different thickness ratios.

This report may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D.C.

## Dennison to Start Air Taxi Service

The Dennison Aircraft Corporation, proprietors of the Dennison Airport, Atlantic, Mass., will begin about June 18 the operation of air taxi service to all parts of New England. Their flying school will also be in operation at that time. The Dennison Aircraft Corporation are the eastern representatives for the Kinner Airplane & Motor Corporation, of Glendale, Cal., and the Eastern Massachusetts dealers for the Waco planes, manufactured by the Advance Aircraft Co., of Troy, Ohio.

The Four R.A.F. Fairey-Napier III F's, that completed the Cairo to Cape Town and return flight, on the Heliopolis airdrome.

## Conversation Between Plane and Ground

A striking demonstration of the developments which have been achieved in radio communication was given in Washington on May 5, when a conversation between occupants of an airplane and the head of the Commerce Department's Bureau of Standards, seated in his office, was broadcast by a regular commercial radio station for the benefit of all listeners within range of the station.

The participants in this broadcast conversation were Dr. George K. Burgess, Director of the Bureau of Standards, and W. B. Stout, head of the Aircraft Division of the Ford Motor Company. Two days before, telephonic and radio communication was carried on between the Assistant Secretary of Commerce for Aeronautics, W. P. MacCracken, Jr., and occupants of an airplane en route from Quantico, Virginia, to Bolling Field at Washington. This conversation, however, was not broadcast.

The conversation between Dr. Burgess and Mr. Stout took place about 12:10 p.m. and was broadcast through station WRC of the **Radio Corporation of America**. After the announcer had explained the details of the demonstration to the radio audience, Dr. Burgess requested a telephone operator to establish a connection with airplane N3 and the conversation ensued.

During the course of the conversation Dr. Burgess explained, for the benefit of the radio listeners, the significance of the experiment and the extent to which the Department of Commerce is assisting in the development of commercial aviation.

The development of the radio aids has been entrusted to the Bureau of Standards, stated Dr. Burgess. They are three in number; the directive radio beacon, which provides an aerial trolley to keep air traffic on its course; marker beacons, which are small radio transmitters marking fixed points, much like milestones; and radio telephony. The Government will establish ground stations for sending radio telephone messages to the airplanes and as time goes on the airplanes will more and more be equipped with radio telephone transmitters, so that it will eventually become common for air travelers to telephone to their friends on the ground.

## New Orleans-Pilottown Bids

Bids were opened at noon on May 17, for the operation of service between New Orleans and Pilottown, La., and between Seattle, Wash., and Victoria, B. C., for the expediting of the mail to and from foreign steamers touching the ports of New Orleans and Seattle.

Only one proposal was received for service on the Pilottown route. This was submitted by Arthur E. Cambas at the rate of $110 per round trip. Mr. Cambas is the present contractor on this route.

Two proposals were received for service on the Seattle-Victoria route. The Northwest Air Service, Inc., Edward Hubbard, president, Seattle, Wash., submitted a proposal at $190 per round trip. The other proposal was submitted by Leo Huber of Seattle, Washington, at $195 per round trip.

The service over these two routes consists in taking mails from the post office after ships for foreign ports have left the dock connecting the mail to the outgoing ship at Pilottown and Victoria. Mail from launching ships is picked up at these points and expedited in delivery to the post office. Seaplanes are used in the service and mails are advanced several hours in both directions.

## Watson Gets Indiana Air King Agency

Earl C. Watson, of Brazil, Ind., and former Army air service pilot has closed a contract with the National Airways System of Lomax, Ill., for the Indiana sales right of Air-King airplanes.

Mr. Watson states that there is unusual interest being manifested in Indiana in aviation. Many new students are being trained and from all indications he expects to make the Air-King the most popular plane in Indiana.

**Mrs. S. C. Elliott-Lynn, Britain's first woman pilot taking aboard her plane the sealed altimeter. Mrs. Elliott-Lynn in a recent flight with Lady Bailey reached a height of 15,000 ft. setting a new world's record for a light airplane.**

## Aeronautical Mechanics Organize

The mechanics engaged on the various flying fields in and around New York recently formed an association, which will be known as the Aeronautical Mechanics Association of America. An organization of this kind should grow rapidly and assume an important place among the various aviation societies of the country. This association invites all aircraft mechanics to join.

The main reason for its organization is to promote good fellowship among the increasing number of people making up the ranks of those who work as mechanics in the industry.

The officers and members of the association are all employed as mechanics and applicants will be thoroughly investigated before admittance. By addressing the Aeronautical Mechanics Association of America, Curtiss Flying Field, Garden City, L.I., N.Y., full information can be obtained.

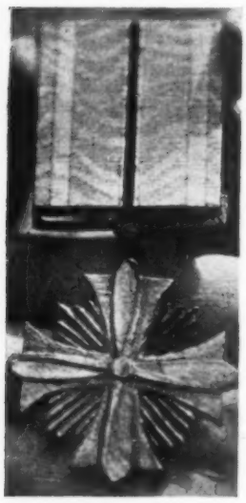
## Dr. L. Prandtl Awarded Gold Medal

At a recent Council Meeting of the Royal Aeronautical Society it was unanimously decided to award the Gold Medal of the Society to Dr. L. Prandtl in recognition of his remarkable outstanding work on aerodynamics. The delivery of the Fifteenth Wilbur Wright Memorial Lecture by Dr. L. Prandtl was the occasion for the actual presentation of the highest honour the Society can confer. The Gold Medal has now been awarded to the following:—

Wright Brothers, May, 1909; Prof. Chanute, October, 1910; E. T. Busk, May, 1915; Prof. G. Bryan, May, 1915; Prof. Lanchester, May, 1926; Dr. Prandtl, March, 1927.

## Distinguished Flying Cross of Simple Design

The design of the Distinguished Flying Cross awarded by the President to Capt. Charles A. Lindbergh was approved by the Fine Arts Commission on May 28, 1927, with suggestions for slight changes in a few minor details. It is of the traditional bronze suspended from a silk ribbon. The colors of the ribbon are mainly blue and white with a narrow red stripe in the center which thus include the national colors of red, white and blue.



Distinguished Flying Cross

As may be seen in the accompanying picture the design is very simple, consisting of a 1½ in. cross patee on which is superimposed a four-bladed airplane propeller which projects slightly beyond the ends of the cross. In the angles of the cross are sun rays, forming a square typifying the glory and splendor of the deed for which the cross is awarded. The metal employed for the medal is in conformity with the old American custom that the value of medals should rest on the honor they represent rather than on their intrinsic worth.

The model which received the approval of the Fine Arts Commission was submitted by Miss Elizabeth Will and A. E. Dubois, War Department employees on duty in the office of the Quartermaster General of the Army. A board composed of both Army and Navy officers passed upon the medal, which has also received the approval of both the Secretary of War and the Secretary of the Navy. Similar medals will be produced for the Pan-American Fliers, who so far have only received citations which were delivered to them by the President upon their arrival in Washington.

## Geo. A. Wies Announces New Flying Course

Announcement has been received from Geo. A. Wies, Inc. of Mineola, N. Y., of what appears to be a new idea in flying training. Mr. Wies is giving a "100-mile" flying course designed to teach a man to handle an airplane in the air. He reports that he finds many men, who for reasons of business or pleasure, want to learn to fly, but do not desire to become professional pilots, and who therefore require a form of instruction totally different from that usually offered.

The "100-mile" course consists of ten to fifteen flights of six to ten miles each, interspersed with ground instruction on the art of flying. No instruction is given in landings or take-off, although the student is permitted to "follow-through" on the controls on several of each. Within this distance Mr. Wies finds that most students can become quite proficient both in straight flight and on slow turns.

For this instruction Mr. Wies uses a Curtiss JN4D, an OX Travel Air and a Whirlwind Travel Air. All are equipped with Pioneer Air Distance Recorders, the use of which eliminates all need for time records. Flights are measured in miles instead of in minutes as was formerly necessary.

It is understood that students who satisfactorily complete the "100-mile" course may continue their training, either to perfect their air work or to practice landings and become full-fledged pilots.

This course has appealed particularly to men employed in the engineering and manufacturing departments of local aircraft factories, and the first class of twelve has been recruited entirely from such plants.

## Wade and Wells Plan Record Globe Flight

Lieut. Leigh Wade, one of the three pilots in the army's 1924 world flight, and Linton Wells, holder of the round-the-world record in twenty-eight days, fourteen hours, and thirty-six minutes, are planning a round the world flight in the hope of completing it in 15 days.

They will try to pilot a three engine plane across the seas, mountains, jungles, and flats of the known world. It is stated that a third man will accompany them as combination radio operator and navigator, and between Japan and Ireland a fourth man, a mechanic, will wing them in their flight against time. It is planned to take the air from Long Island about 5 o'clock on an afternoon late in July and then fly in one hop to San Francisco. The late start will be made in order to get them over Pennsylvania, admittedly one of the worst states to fly over by night, and on to the United States Air Mail track. The great twenty mile beacons of the air mail fields will serve as guides until dawn at which time they expect to reach the Great Divide between Laramie and Rollins, Wyo. From San Francisco they will cross the Pacific to Kasumigaura, Japan, in three jumps, stopping at Honolulu and Midway Island, and then on to Harbin, China, across Siberia and Russia to Paris, London, Queenstown, St. Johns, and on to New York City. The distance to be flown is 20,022 mi. and if a route schedule is maintained, the flight will be made in 204 hrs.

## Curtiss Flying Service Speeds Up

The Curtiss Flying Service, Inc., of Garden City, N. Y., reports that the first two weeks of May were the busiest in the history of the organization. Throngs crowded the field from dawn to dusk, and Curtiss pilots flew almost day and night trying to accommodate passengers who wanted their first hop in the air. On Sunday, May 14, over three hundred and fifty passengers were carried and the total for the two weeks was something over eight hundred passengers.

In addition to the large amount of passenger business, the Flying Service was exceptionally busy in other phases of its operations. The visit of the Atlantic Fleet to New York occasioned much interest and all of the newsreel organizations, as well as several newspapers, chartered planes to

Curtiss Field on Sunday May 14.

photograph the fleet from the air, while half a dozen sightseeing trips were made over the harbor carrying passengers who chose this method of getting a bird's-eye view of Uncle Sam's mighty armada. Other operations included aerial photography and mapping and one night flight from Louisville to Cleveland with pictures of the Kentucky Derby.

The total flying time for two weeks was something over 145 hours and M. M. Merill, manager of the Curtiss Flying Service, Inc., contends that 10 hours of paid commercial flying a day is somewhat of a record for any flying organization.

# FOUR WORLD'S RECORDS *for the VOUGHT "CORSAIR"*

ALTITUDE SPEED SPEED SPEED

22,178 Feet | 100 Kilometers | 500 Kilometers | 1000 Kilometers

LT. G. R. HENDERSON, U.S.N.

A STANDARD Vought "Corsair" Naval Seaplane, on April 14, 1927, reached a record altitude of *22,178 feet,* carrying a ballast load of 1102 lbs., and a total useful load of 1640 lbs. Pilot G. R. Henderson, U.S.N. Pilot.

LT. S. W. CALLAWAY, U.S.N.

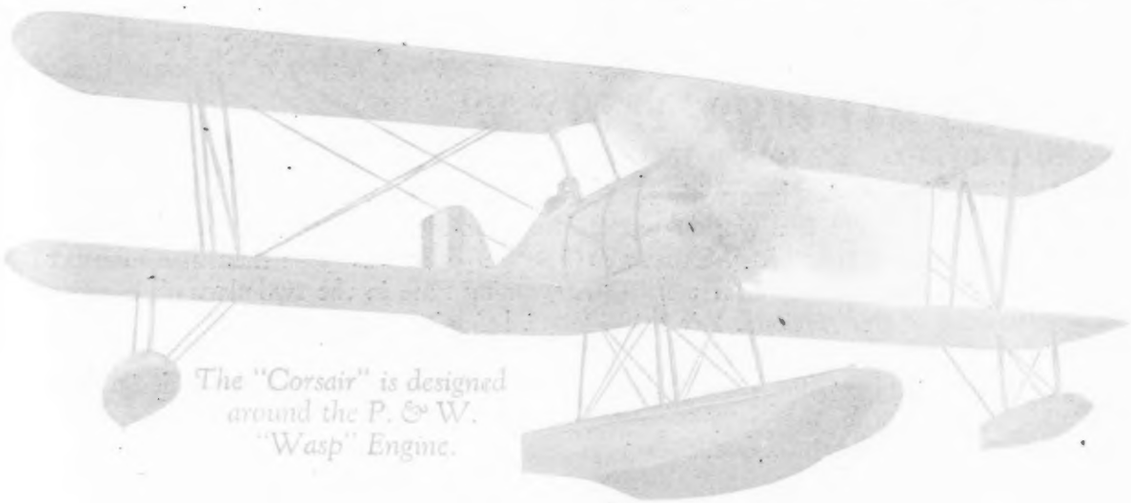
THE same seaplane, on April 25, 1927, with the same ballast load and 1675 lbs. useful load, averaging *147.263 miles* per hour for 100 kilometers around a 25 kilometer closed course. Lieut. S. W. Callaway, U.S.N. Pilot.

LT. J. D. BARNER, U.S.N.

ON April 30, 1927, the same "Corsair" seaplane flying around the same short 25 kilometer course, averaged 136.023 miles per hour for 500 kilometers, carrying 1880 lbs. useful load including 1102 lbs. ballast. Lieut. J. D. Barner, U.S.N. Pilot.

LT. RUTLEDGE IRVINE, U.S.N.

AND still a fourth World's Record was made by the same "Corsair" seaplane on May 21, 1927, when an average speed of *130.93* miles per hour for 1000 kilometers was made over the same closed course! Lieut. Rutledge Irvine, U.S.N. Pilot.




## CHANCE VOUGHT CORPORATION

LONG ISLAND CITY, NEW YORK

Lieuts. S. W. Callaway, G. R. Henderson and J. D. Barner, U. S. N. in front of the "Wasp" engined Vought "Corsair" seaplane

## Altitude

On April 14, 1927, Lieut. G. R. Henderson, U.S.N. in a "Corsair" Seaplane reached 22,178 feet with a dead load of 1,102 pounds and a total useful load of over 1500 pounds.

## Speed
### 100 Kilometers

On April 23, 1927, Lieut. S. W. Callaway, U.S.N. with the same plane and load averaged 147.263 miles per hour for 100 kilometers around a closed course.

## Speed
### 500 Kilometers

On April 30, 1927, Lieut. J. D. Barner, U.S.N. under the same conditions averaged 136.023 miles per hour for 500 kilometers.

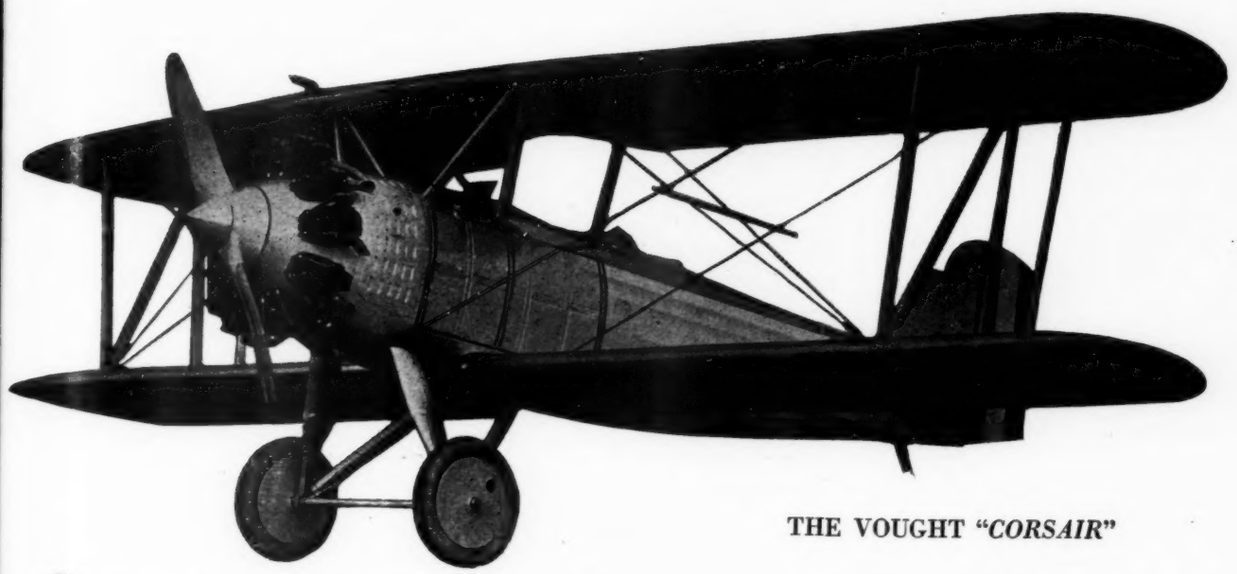
# Three New World's Records
## for the "WASP"

This standard Vought Seaplane with a standard "Wasp" Engine holds the unique distinction of having established world's records for both altitude and speed. Particularly remarkable is the fact that Lieut. Callaway's average speed was more than five miles per hour greater around a closed course than the winning time in the two-place observation land plane race at the National Air Races in Philadelphia last year.

This remarkable performance is the natural result of superior plane and engine design, and skillful piloting. Again the Navy gives substantial proof that its flying officers and service equipment are second to none.

THE
**PRATT & WHITNEY AIRCRAFT CO.**
HARTFORD CONNECTICUT

## DARTMOUTH-TEX IS USED ON CHANCE VOUGHT PLANES



THE VOUGHT "*CORSAIR*"

# QUALITY is the watchword for every component in Vought planes

*—and QUALITY is the controlling factor in the specifications of*

DARTMOUTH-TEX

*aero-cloth and tapes for Vought planes —*

DARTMOUTH-TEX is the name adopted for the aerocloth which has been used by the leading aircraft manufacturers in America for 16 years. *Dartmouth-Tex* is a *grade A*, mercerized cotton, full count fabric, 36 inches wide for wings, tail surfaces and fuselage coverings.

It is guaranteed to meet the most rigid government specifications, and can be obtained on convenient rolls, which insures against creasing and wrinkling. It is not a processed fabric, although it can be supplied in processed form if desired. Durable tapes of all kinds—surface tapes, pinks, (scallops)—in any size required are ready for immediate delivery in all quantities.

*Sole Distributor of*
DARTMOUTH-TEX

**W. HARRIS THURSTON**
THURSTON CUTTING CORPORATION
116-118 FRANKLIN STREET
NEW YORK CITY

DARTMOUTH-TEX
Registration Applied For

## THE LEADING GRADE "A" AERO-CLOTH FOR 16 YEARS

NEW JERSEY VENEER CO.

SHERWOOD 5955 PATERSON, N. J.

*Furnished the Plywood used in the construction of the Record Breaking*

# VOUGHT NAVY "CORSAIR"

## Grade "A" Plywood to meet current ARMY and NAVY Specifications.

**We keep on hand Mahogany and Birch Plywood in stock sizes for rush shipments and on account of very large stocks of single ply veneers of various thicknesses we are able to ship in ten days plywood,**

*Made To Your Dimensions.*

The "CORSAIR"
Bearer of Three World's Records
manufactured by
Chance Vought Corporation

*...and now record-breaking aircraft use*

# EDWARD SMITH
## PAINTS and VARNISHES

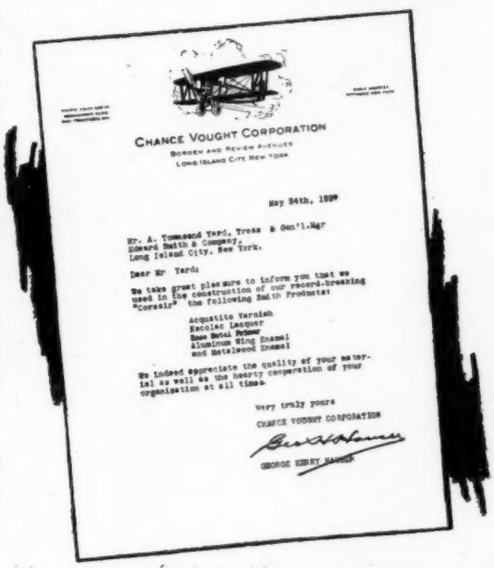
THE Edward Smith 100-year reputation for quality in marine paints and varnishes is the aircraft manufacturer's guarantee of finest finish and lowest ultimate cost.

Aircraft and marine craft meet identical conditions of exposure — wind, moisture, salt, heat and cold.

For an entire century Edward Smith products have unfailingly proved their value on boats and yachts of every description — even to the famous winners of the International Cup Races.

Now these materials are winning a similar position in the aircraft field, where beauty and durability of finish are paramount considerations.

The Chance Vought Corporation used Edward Smith products on their record-breaking "Corsair" as a natural result of over three years of practical tests on aircraft of their manufacture. Aquatite Spar Varnish, Escolac Lacquer, Esco Metal Primer, Aluminum Wing Enamel and Metalwood Enamel were used.



CHANCE VOUGHT CORPORATION
BOROEM AND REVIEW AVENUES
LONG ISLAND CITY NEW YORK

May 24th, 1927

Mr. A. Townsend Yard, Treas & Gen'l.Mgr
Edward Smith & Company,
Long Island City, New York.

Dear Mr Yard:

We take great pleasure to inform you that we used in the construction of our record-breaking "Corsair" the following Smith Products:

Aquatite Varnish
Escolac Lacquer
Esco Metal Primer
Aluminum Wing Enamel
and Metalwood Enamel

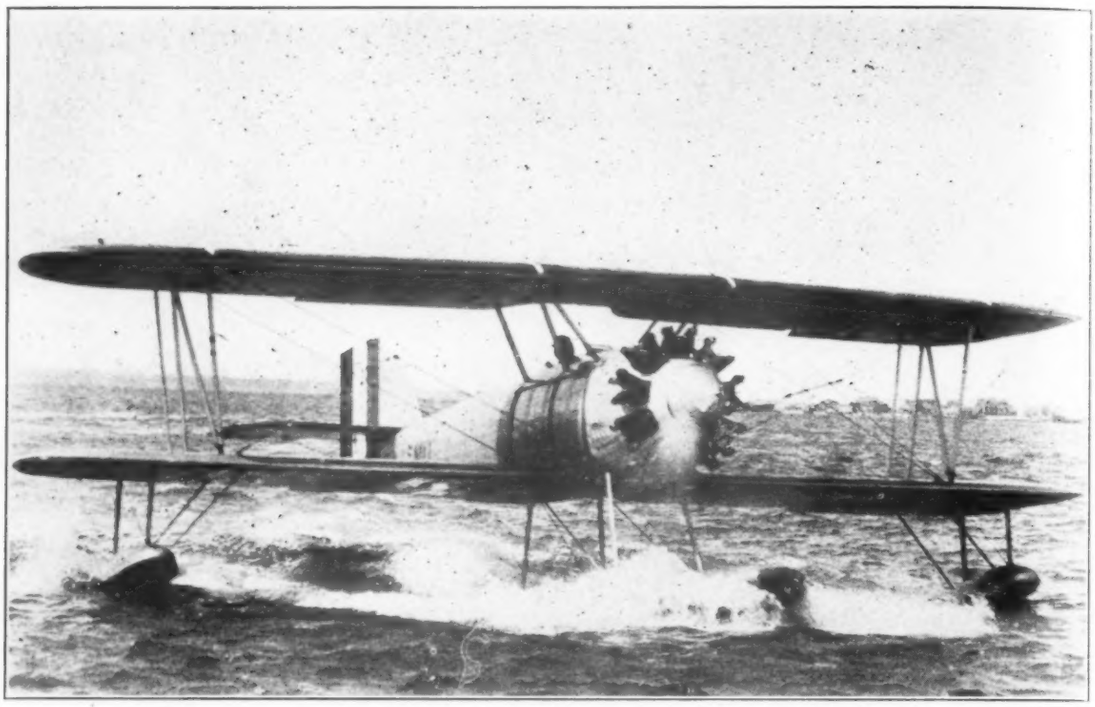
We indeed appreciate the quality of your material as well as the hearty cooperation of your organization at all times.

Very truly yours
CHANCE VOUGHT CORPORATION
GEORGE HENRY HAMER

We shall be glad to demonstrate to other aircraft manufacturers the practical advantages of using Smith Paints and Varnishes for interior and exterior finishes and for metal as well as wood.

# EDWARD SMITH & COMPANY
LONG ISLAND CITY, N. Y.

*Makers of Marine Paints and Varnishes for* 100 *Years*



*The Record-breaking Vought "Corsair"*

*is equipped with a*

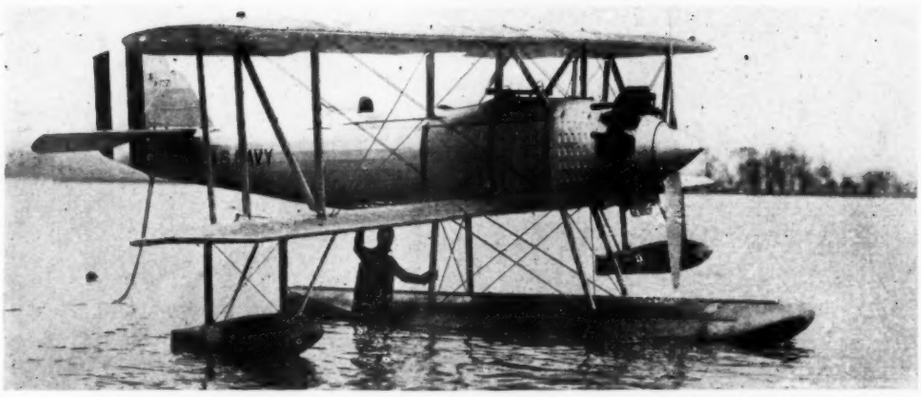
# STANDARD STEEL PROPELLER

STANDARD Steel Adjustable Pitch Propellers are not only helping to bring back air records to America, but are in regular service on modern Army, Navy, Air Mail, Commercial and privately owned planes.

## STANDARD STEEL PROPELLER COMPANY

*General Offices & Works*

221 SEVENTH AVENUE WEST HOMESTEAD, PA.



THE VOUGHT "CORSAIR"
Powered with Pratt & Whitney "Wasp" 425 h.p. Engine
*Equipped with*

SCINTILLA

**AIRCRAFT MAGNETOS**

SCINTILLA MAGNETO COMPANY, INC.

*Contractors to the U. S. Army and Navy.* SIDNEY, NEW YORK

*A* NAIL *with a* BULLDOG GRIP

Here is a nail that holds wing cloth in a bulldog grip. Drives like a nail. Turns like a screw. Cannot pull out or work loose.

. . . Just one example of the type of nails, rivets and screws we manufacture to meet the special requirements of many of the most prominent companies in the aircraft and automotive industries.

Send us your specifications. Any metal, size and quantity. Prices and samples gladly furnished.

*Enlarged drawing of special nail for holding wing cloth. Actual size one half inch long, diameter in proportion.*

JOHN HASSALL, Inc.

*Established* 1850

Clay & Oakland Streets, Brooklyn, N. Y.

Aluminum Rivets
Aluminum Alloy Rivets
Small Flat Head Brass Nails, plain or cement coated.

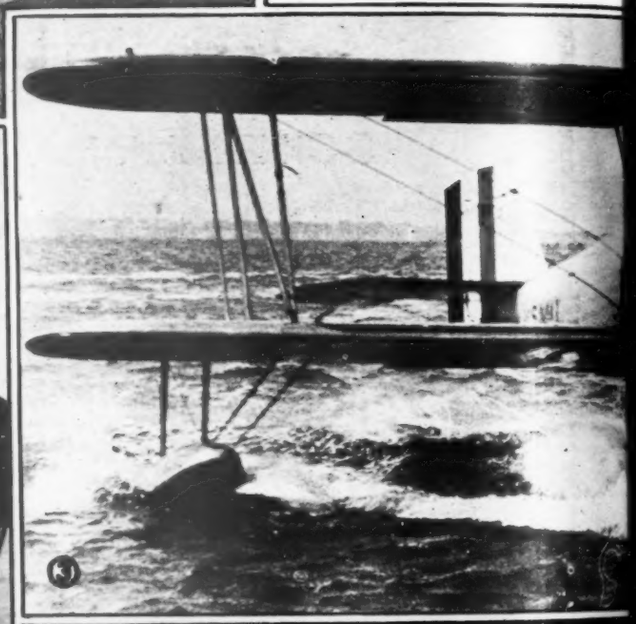
Stainless Iron Rivets
Small Flat Head Steel Nails, plain, Udylited, Parkerized, Electro galvanized. Cement coated after finishing.

# Vought Planes in Service on

1. Vought OU-[illegible] on exhibition at the All-American Aircraft Display, Washington, D. C., May 2-8.

2. Over the side. A Vought plane leaving the catapult of the U.S.S. Memphis.

3. A record breaker. The Vought OU-2 landing at Hampton Roads, Va., after setting a new world's speed record for seaplanes around a 25 kilometer course, Lieutenant S. W. Calloway, pilot. This plane has brought back to America, four worlds records since April 11, 1927.

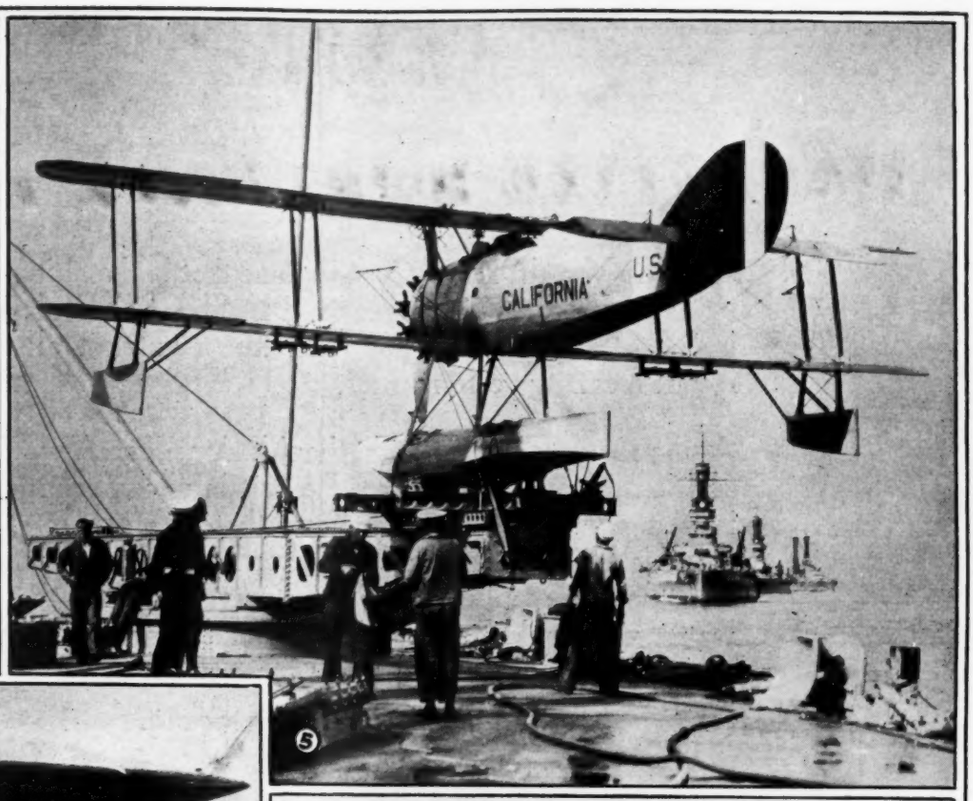


# e U. S. Navy and Land

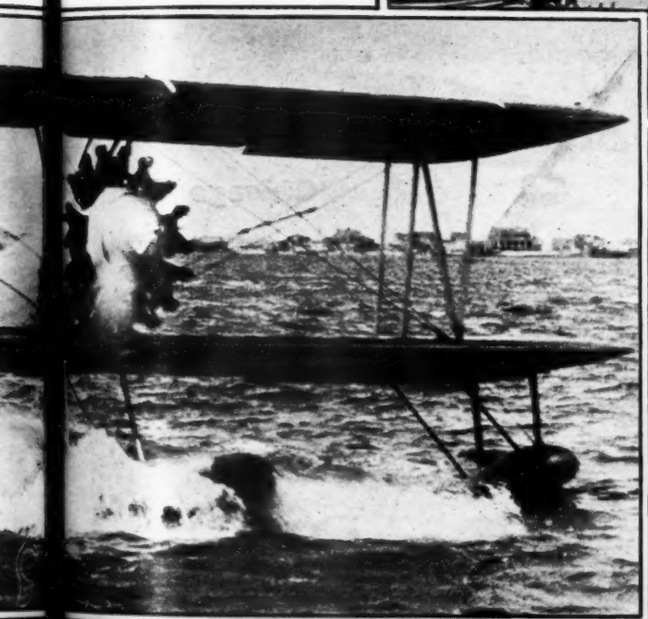
Night flying. Vought Navy planes under the glare of a floodlight at the Navy station at Anacostia, D. C.

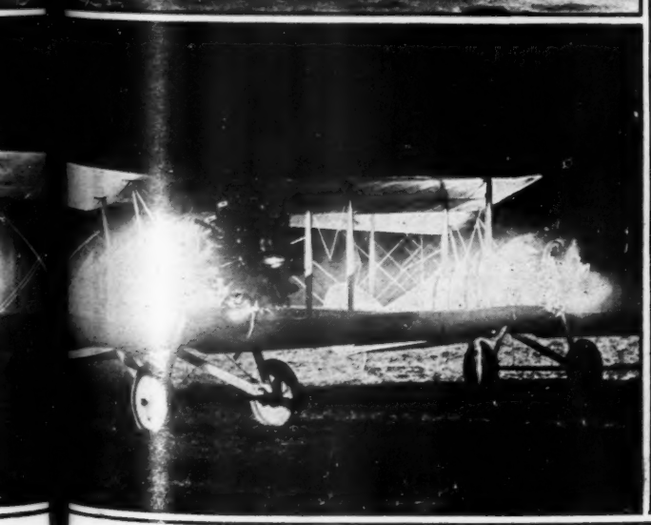
With the fleet. A Vought on the catapult of the California with the Fifth Division of the U. S. Fleet off San during its annual maneuvers.

Catapulting at sunset. A Vought about to be shot from the of the U.S.S. Pennsyl-




⑤





⑥

# HASKELITE helps break records

IN the Vought Navy Corsair plane that broke altitude and speed records for seaplanes, HASKELITE played an important part. This has been true in almost all recent record breaking performances.

At the air races last year—at the All American Aircraft Exposition this year—wherever the best in aircraft construction is seen, our oft repeated statement that 85% of aircraft plywood is HASKELITE has proven true. HASKELITE is not ordinary plywood. Its strength, light weight and waterproof quality are unequalled and so dependable that designers and builders naturally insist on its use.

*Blue print booklet on request.*

**Haskelite Manufacturing Corporation**

**133 West Washington Street** **Chicago**

*We have furnished more than a score of*

# SUPERCHARGERS

FOR USE IN

# VOUGHT PLANES

SUPPLIED TO THE U. S. NAVY

*It is a privilege to add our congratulations on the recent achievements of the Corsair.*

ALLISON ENGINEERING COMPANY

INDIANAPOLIS

IN the period of commercial aviation just ahead — when municipalities, corporations, and individuals fully realize the reliability, utility, and economic advantages of present day aircraft in competitive business activities:—

When the demand for aircraft strains production facilities and automotive history is eclipsed:—

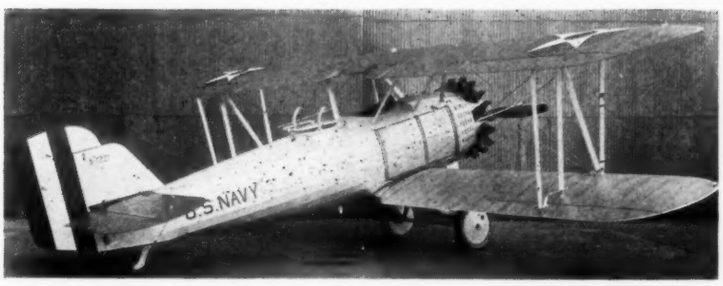
Production and development of "PARKER" tube couplings, fittings and fuel line equipment will keep pace with the demand.

**Fuel flowed safely through "PARKER" tube couplings in the Vought Navy Corsair stock plane which brought back to America three World's seaplane records —these couplings will not need replacement—they are dependable for the life of the ship.**

*A New catalogue fully descriptive of "PARKER" tube couplings and aeronautical fittings is in process — send for your copy.*

THE PARKER APPLIANCE COMPANY

CLEVELAND, OHIO




# THE FUEL AND OIL TANKS

## *of the Record-breaking Vought "Corsair"*

***were built by***

PARAMOUNT

**PARAMOUNT WELDED ALUMINUM PRODUCTS CORPORATION**

**40-42 SOUTH EIGHTH STREET, BROOKLYN, N. Y.**

# ECLIPSE
## AVIATION STARTERS

**Vought Ships, Models UO-1, FU-1 and O2U-1 are equipped with ECLIPSE Inertia Starters.**

**ECLIPSE MACHINE COMPANY**
**HOBOKEN PLANT**
Elmira, New York — Hoboken, New Jersey — Walkerville, Ontario

FLIGHTEX FABRIC
REGISTERED U.S. PAT. OFF.

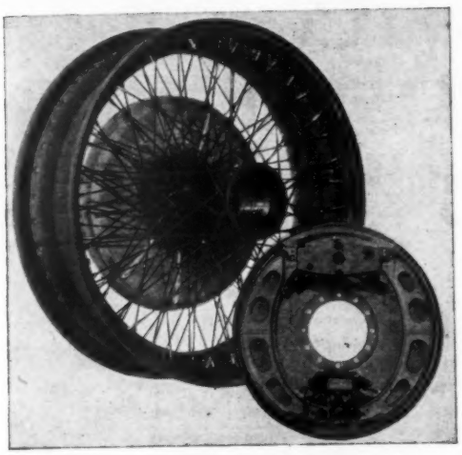
***ANOTHER RECORD BREAKER***
***The VOUGHT "CORSAIR"***

Flightex Fabric is used by Chance Vought Corporation for covering the wings, fuselage and tail surfaces of this phenomenal plane.

DEPENDABLE - STRONG - DURABLE

E. S. TWINING & CO.
320 Broadway New York, N. Y.

# SAUZEDDE
## *Wheel and Brake Units*



*are used on*

# CHANCE VOUGHT PLANES

## SAUZEDDE UNITS
### are also used by

Atlantic Aircraft Corporation
Boeing Aircraft Corporation
Buhl Aircraft Corporation
Curtiss Aeroplane and Motor Co.
Hamilton Aero Mfg. Co.
Keystone Aircraft Corporation
E. M. Laird Airplane Co.
Sikorsky Mfg. Corporation
Travel Air Mfg. Co.
U. S. Government
Yackey Aircraft Co.
and others.

*Prices and Specifications Furnished on Request*

SAUZEDDE CORPORATION
DETROIT, MICH., U.S.A.

CARLISLE

*made the*

**"BUOYANT" - "EASILY REMOVABLE"**

# SEAT CUSHIONS

*for*

**THE VOUGHT "CORSAIR"**

*KAPOK FILLED CUSHIONS are buoyant in water and removable—They pass government specifications for life preservers.*

**CARLISLE MANUFACTURING CO., INC.**
**104-106 West 14th Street**
**New York City**

## S.S. White Tachometer Drive Shafts

***are stock equipment on all Chance-Vought Planes***

**Like most of the leaders in aviation, the Chance-Vought Corp. installs S.S. White Tachometer Drive Shafts in all of its models.**

*We supply them to the U. S. Army and Navy*

The S.S. White Dental Mfg. Co. for many years has manufactured superior flexible steel wire shafts for every industrial purpose.

**All lengths carried in stock.**

**Samples furnished to responsible manufacturers**

**The S. S. White Dental Mfg. Co.**
***Industrial Division***
**152 West 42nd Street, New York, N. Y.**

ALL

# Metal Fittings

used on the famous

## VOUGHT PLANES

are manufactured by

SMITH-HAFECOST
INC.
129 Grand Avenue
Brooklyn, N. Y.
*Established 30 Years*

Our plant is unsurpassed in equipment for the manufacture of machine parts and aircraft fittings for all aircraft requirements. Specialists in

TOOLS, DIES, FIXTURES, JIGS,
OF ANY INTRICATE NATURE
*(Send Specifications for Price Quotations)*

# Roebling

## Control Cables

AIRCRAFT CORD

*are used on*

CHANCE
VOUGHT
PLANES

**John A. Roebling's Sons Company**
**Trenton, New Jersey**

## The Vought "Corsair"

**carries**

PIONEER INSTRUMENTS

The instrument board of the "Corsair", illustrated above, carries the following instruments:

Pioneer Fuel Level Gauges (two)
Pioneer Engine Gauge Unit
Pioneer Vertical Tachometer
Pioneer Bank & Turn Indicator
NSII Compass, rebuilt by Pioneer
Altimeter (War Surplus).

All instruments for the "Corsair" were furnished to the Vought Corporation by the Navy Department.

**PIONEER INSTRUMENT COMPANY**
**754 LEXINGTON AVE. BROOKLYN NEW YORK**

# Dayton Wire Wheels

*used on*

## All Vought Convertible Land and Sea Planes

Dayton Wire Wheels FOR AIRPLANES & AUTOMOBILES

THE DAYTON WIRE WHEEL CO.,
DAYTON, OHIO

AT YOUR SERVICE

AERO SUPPLY MFG. CO., Inc.

Manufactureres and Distributors of

Airplane Accessories and Supplies

Call on us for anything. We will help you.

**College Point, - Long Island, - New York.**

CHANCE VOUGHT CORPORATION

ON VOUGHT NAVY "CORSAIR"

USE — AS ON ALL THEIR PLANES

THE PERRY-AUSTEN DOPES

BEST DOPES MADE

MANUFACTURED BY

PERRY-AUSTEN MFG. CO.

STATEN ISLAND, N. Y.

*Pioneer Dope Manufacturers*

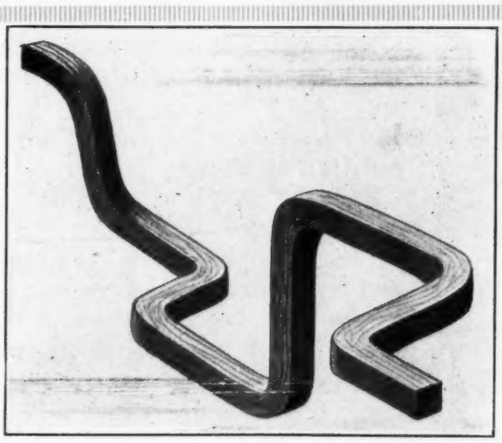
*Contractors to U. S. Government*

*We furnished the Curtiss Aircraft bendings during the War.*

**BENT WOOD**

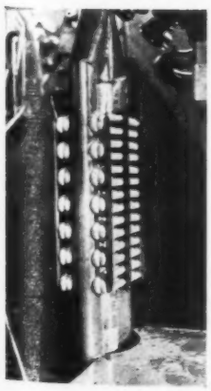
This illustration of bent Ash wood 2" square shows the almost uncanny control of wood bending processes we have developed, and indicates our supreme position in this field.

Of Course We Furnish Vought



**SPECIAL AIRCRAFT ASH PLANK**

**H. G. SHEPARD & SONS**
NEW HAVEN, CONN.



RUSCO SHOCK ABSORBER RINGS

***Take shocks on multiple individual units***

***High Safety Factor*** -- 10% or more of rings can be broken and a safe landing effected.

***Easy Replacement of Broken Rings***—Broken ring replacable in a few minutes — other rings do not have to be disturbed.

**THE RUSSELL MANUFACTURING COMPANY**

*Manufacturers of shock absorber cord and reinforcing tape used on "Vought" planes.*

**Sales Office—349 Broadway, New York City. Factory—Middletown, Conn.**

*Also tapes, plain or picot edge; webbing for parachute harness and life belts; brake linings and clutch facings.*

## CHANCE VOUGHT PLANES

*are equipped with*

## SEAMLESS STEEL TUBING

*ROUND, STREAMLINE, ETC.*

Furnished to Specifications in

STRAIGHT CARBON
NICKEL STEEL
CHROME MOLYBDENUM

*Specialists in Aircraft Tubing—Manufacturers for 25 Years.*

**Summerill Tubing Company**

**Bridgeport, Montg. Co. (Philadelphia District) Pa.**

# Vought Airplanes

**ALWAYS GET THERE IN PERFECT CONDITION**

*They are Packed in Long Island Packing Cases.*

We supply many large manufacturers with

PACKING BOXES
CRATES
SHOOKS
CRATING LUMBER

**Long Island Packing Box Co.**

**Long Island City, New York**

Lieut. Doolittle, with Lap Pack type; Lieut. Brookley, with Seat Pack type — IRVIN Air Chutes.

## In the Service of U.S.A.

They think nothing about it now. These men of the Army Air Service. They step easily into their "IRVIN" harness before going up. And then as they sit comfortably with the "pack" attached, they forget it entirely. Yet it's ready for instant use—if they need, or want it. And it gives them that confident feeling of "ready for anything". Likewise with the U. S. Navy and U. S. Air Mail services.

*Manufactured by*

**Irving Air Chute Co., Inc.**
523 Main Street
**Buffalo, N. Y.**

*Cable Address "Irving, Buffalo"*

AIR CHUTES IRVIN

## *Macwhyte Tie Rods on Vought Planes*

MACWHYTE Streamline Tie Rods give 10% greater flying efficiency. Wind resistance is cut to the absolute minimum. We will be glad to tell you the details. Ask for complete information about Macwhyte Round Tie Rods for internal bracing. Macwhyte Company, 2907 Fourteenth Ave., Kenosha, Wis.

MACWHYTE
*Streamline* TIE RODS

# VOUGHT AIRPLANES

## 1918-1927

### TEN YEARS OF UNBROKEN PRODUCTION

## A Record Unexcelled

BACK of this record stands the confidence of the United States Navy and Army Air Services in the products of the organization which has never failed to produce new and better designs to fulfill their requirements, no matter how difficult the problem.

Back of this record stands the confidence of the men who fly—for they know their Voughts are built to stand the gaff; and these men will tell you of the ease and comfort with which these planes fly.

Back of this record stands the Vought purpose—to build the BEST AIRPLANE it is possible to build for the function to be performed. We have not spared, nor will we ever limit or stint, in any way, or in any thing, which will further that purpose

Back of this record stand the men who design and build Vought planes—men who have been in the industry since the days of the Wright Brothers, as ***flyers*** as well as builders — and who know what should go into a plane to give real service and the highest possible performance.

*The "Corsair" is the latest example of Vought engineering leadership and superior design.*

## CHANCE VOUGHT CORPORATION

**Long Island City, N. Y.**

# Night Flying Equipment for the Airdrome. IV

By WILBUR T. HARDING

IF THE problem of properly lighting a large airdrome or even a small one with numerous obstacles is considered it will be found that it is not advisable to use a parallel distribution system, but to use a series constant current system. The series constant current system has been used extensively for street lighting for some time, but the applica-

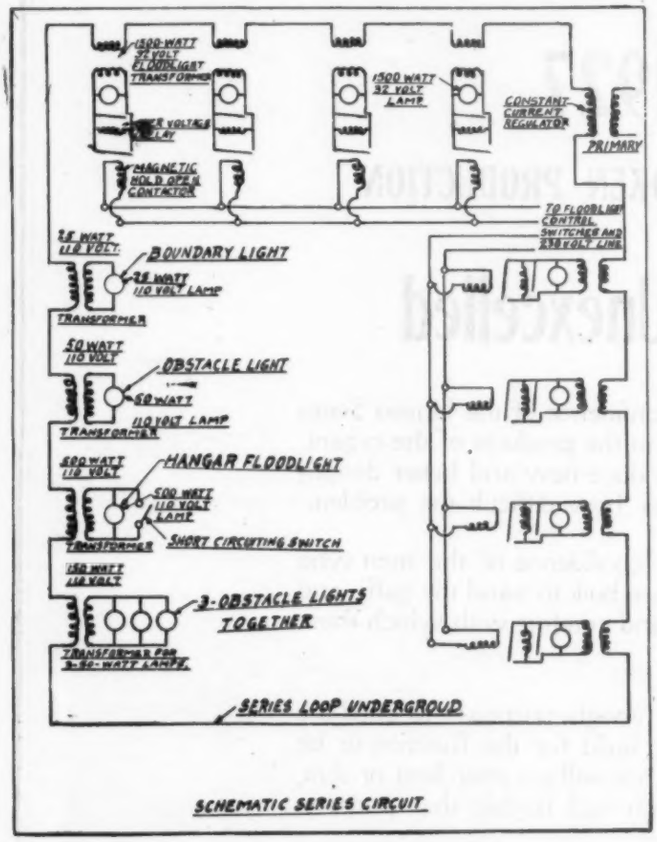



Fig. 24

tion to lighting an airdrome was such as to require special consideration and study at McCook Field.

In a constant current series system a single conductor passes from lamp to lamp so that a loop is completed through a constant current regulator. This regulator is nothing but a moving coil transformer so arranged to vary its secondary voltage as to maintain constant current in the series loop. For street lighting the usual current used is 6.6 amperes. The lamps used on such a circuit are special 6.6 ampere and require a special socket to take care of lamp failure. This, a film cutout socket, has its terminals separated by a thin film disc, which punctures upon failure of the lamp, due to the high impressed voltage and thus completes the continuity of the circuit. The system as described above usually has an overhead distribution system.

For airdrome use there are several objections to the above arrangement. Part of these objections are as follows:

*a.* For underground construction it is a difficult problem to safely insulate a high voltage conductor terminating in a film cutout socket on a pipe standard.

*b.* Due to fire hazard it is not permissible to bring the constant current conductor through or on buildings.

*c.* In case an airplane "cracks up" against such a conductor it may increase the hazard of fire or damage to life.

*d.* A special lamp with surplus film cutouts is required, which necessitates education of personnel making replacements. (The Air Corps has to contend with unskilled, Army personnel maintaining such installations. The special lamp was not desired as it would increase the stock necessary to be carried.)

An investigation, at McCook Field, was conducted to determine a safe, feasible method of using a series system. These tests have shown that such a system may be used if installed properly. The system is very similar to that used for underground boulevard street lighting and uses the moving coil regulator. Single conductor, 3500 volt, Parkway cable, No. 12, should loop the field passing along the hangar line around the boundary and adjacent to the various obstacles as practical. This cable should be buried directly in the ground in a shallow trench.

To eliminate film cutouts and to allow use of regular 110 volt lamps an individual lamp transformer may be used. The primary is designed for the constant current series circuit and so insulated. The secondary is designed to operate under one condition of load only. For boundary lights one 25 watt, 115 volt lamp should be used with a transformer likewise rated. Any other wattage lamp will not operate satisfactorily upon this transformer. Likewise, another trans-

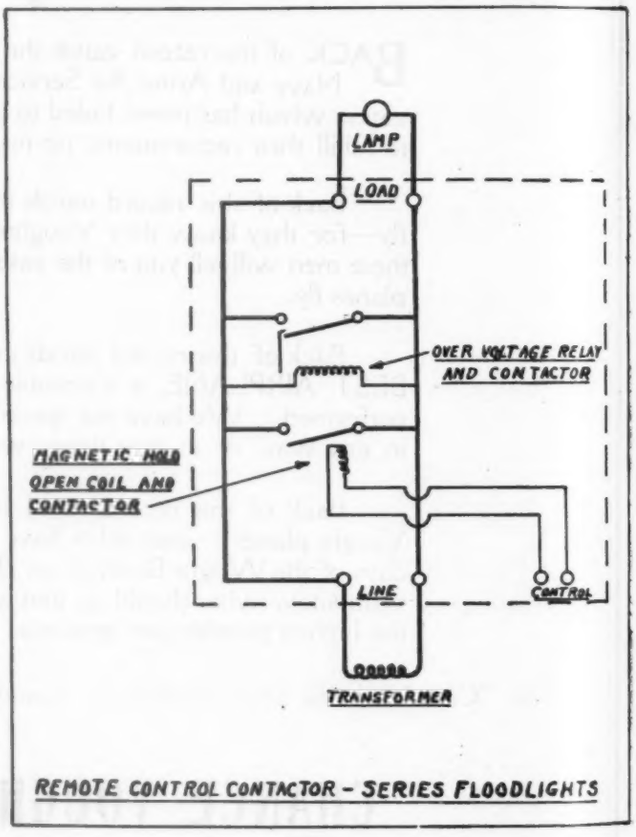



Fig. 25

former is necessary for the 50 watt obstacle lights. The transformer must be used for the conditions for which it is designed and no other.

These transformers may be designed to operate one or more 115 volt, multiple lamps, in parallel. Consequently for a building upon which two obstacle lights are desired it will be necessary to use either one transformer for two 50 watt lamps, or two transformers each for a 50 watt lamp. The latter is the more desirable as the regulation is better and lamp burnout of one will not affect the other.

For each lamp (or group of lamps) one transformer is connected into the series loop. The secondary can be com-

pleted to the lamp (or lamps) in multiple with BXL cable. The entire transformer and taps can be installed in a steel box filled with compound and buried in the ground, eliminating wiping of lead joints. The advantages of such a system are as follows:

*a.* The entire installation cost is lower than equivalent parallel circuit.

*b.* The high voltage conductor is below ground.

*c.* "Crack up" of an airplane into a lamp would not cause additional hazard to life or property.

*d.* A short or open of the lamp circuit will not affect the rest of the circuit or hurt the transformer.

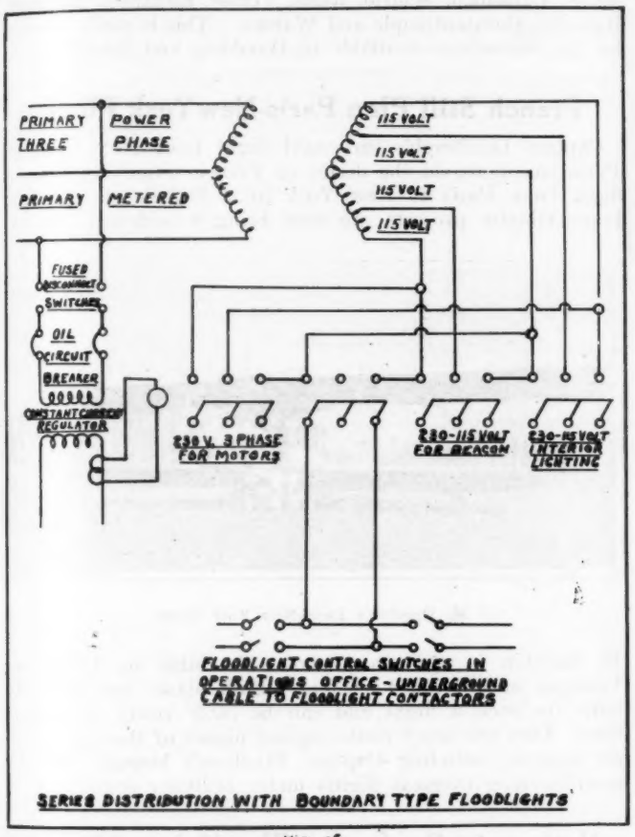



Fig. 26

*e.* Lamps may be installed on buildings if desired.

*f.* Film Cutouts and special lamps are not required.

*g.* All lamps operate at normal voltage.

*Application.* Figure 24 gives a schematic diagram of the method of using series lighting. The following equipment should be connected to the series circuit so as to operate continuously:

*a. Boundary Lights.* Each should have one 25 watt, 115 volt lamp transformer.

*b. Obstacle Lights.* For isolated lights each should have one 50 watt, 115 volt transformer. For groups of lights, each group should have one 115 volt lamp transformer designed to operate the group of lights.

*c. Wind Direction Indicator.* Thirteen 10 watt lamps are used in parallel. The lamp transformer should be designed for a total of 130 watts at 115 volts and to operate 13 lamps in parallel.

For multiple operation of lamps it will be necessary to replace burnout lamps immediately.

*Special Applications.* It is possible to operate lamps of a non-continuous operation from the series lighting system. It is not advisable, however, to use the same switching arrangements as for multiple lamps. If it is desired to turn a lamp off, all that is necessary is to short the transformer secondary. This allows the secondary current to follow a path of less resistance. The resulting short circuiting current is approximately full load current, but the loss involved is small. If the secondary is opened the reactance of the primary increases and to maintain constant current in the primary, a higher voltage is required. The loss on open secondary circuit is more than upon shorted secondary conditions. *Consequently, to turn off lamp burning from a series transformer the secondary should be shorted.* Two applications of this can be made for airdrome use.

*a. Hangar Floodlights.* To operate a hangar floodlight with a 500 watt, 110 volt lamp, a transformer of the same rating will be required. This transformer also may be buried in the ground and provision made with a single pole switch to turn the lamp off by shorting the secondary. BXL cable should be used from transformer to lamp.

*b. Landing Field Floodlights.* A special application for operating four 1500 watt, 32 volt transformers is at present under consideration. It is possible to secure a transformer which operates very satisfactorily upon load or short circuit conditions. Those tested to date have too high a reactance on open circuit. Consequently upon lamp burnout the current in the series circuit is reduced. This can be overcome by using a film cutout at the lamp which would puncture at 300 volts. However, as control of these floodlights is desired at some central point a special remote control contactor is being developed. Figure 25 gives the electrical connections. One single pole contactor normally shorts the transformer secondary and the lamp is then out. To light the lamp a separately excited, 220 volt, magnetic coil removes the short from the transformer which remains open as long as it is excited. A second single pole contactor is supplied, normally held open but arranged to close with spring action when tripped by a shunt coil. This shunt coil placed across the lamp is arranged to operate at 100 volts. Upon failure of the lamp the secondary voltage rises with rise in primary

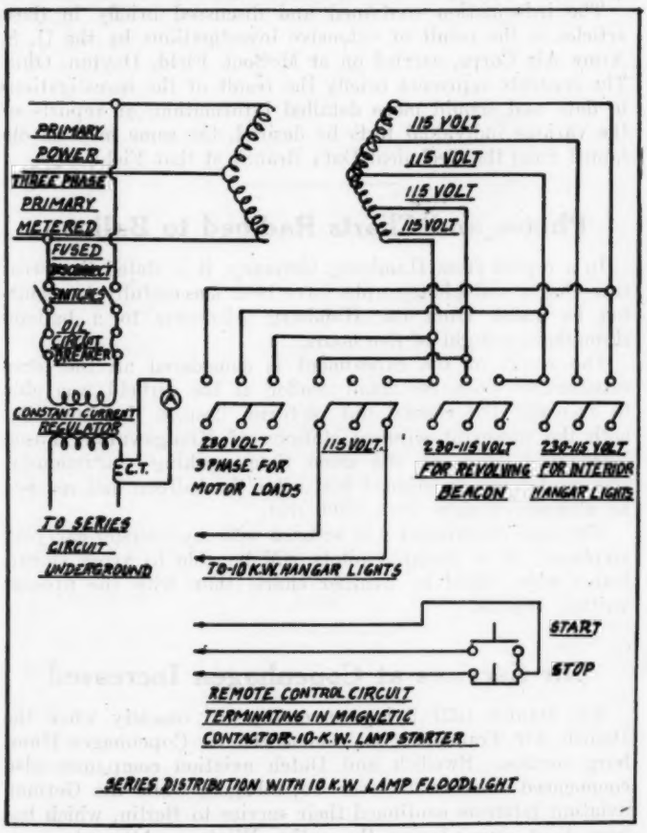



Fig. 27

voltage and trips the contactor shorting the lamp. Thus, lamp burnout will not effect the operation of the rest of the circuit. This will remain shorted until the lamp has been replaced.

*Distribution.* The distribution systems described previously cannot be used with the series circuit. Figure 26 shows

how the transformers and distribution circuits should be arranged for use with boundary type floodlights operated on a series circuit. A 230 volt circuit is supplied for operating the floodlight control contactors with switches for turning on either bank desired. The control circuits to the contactor may be two conductor No. 12 Parkway cable, 600 volt. The contactor should be installed above ground on the floodlight support in a weather tight metal box. The revolving beacon should be connected to the 230-115 volt circuit with three conductor Parkway cable, and may be controlled at the switchboard. The constant current regulator of proper capacity, should be connected on the primary side with an oil circuit breaker and auxiliary disconnect switches. The secondary should be connected directly to the series circuit without breaker or switch but with a current transformer and ameter in the circuit as shown.

### Periodic Inspections Necessary

For a combination using the series lighting and the 10 kw. lamp floodlight the distribution should be as shown by Figure 27. The floodlight connections are as described previously. In case this arrangement is used the capacity of the regulator is that required to handle the obstacle, boundary and exterior hangar lights. Additional capacity for landing floodlight is supplied by the 230-115 volt transformer.

Once a system is installed it should be given periodic inspections. All lamps on burnout should be replaced at once if the system is to function properly to safeguard the lives of those using the field at night. The rotating beacon should receive regular attention and magnetic contactors, when used, should be kept painted and if a little care is taken to maintain the equipment the installation will have a long life.

The information contained and discussed briefly in these articles is the result of extensive investigations by the U. S. Army Air Corps, carried on at McCook Field, Dayton, Ohio. The contents represent briefly the result of the investigations to date and should more detailed information, or reports of the various individual tests be desired, the same may be obtained from the Technical Data Branch at that Field.

## Photos and Charts Radioed to Balloon

In a report from Hamburg, Germany, it is stated that weather charts and photographs have been successfully transmitted by radio from the Hamburg Airdrome to a balloon throughout a flight of five hours.

The result of the experiment is considered all the more satisfactory since the small sender at the airfield was able to transmit the charts and pictures, despite the fact that both the powerful wireless stations of Konigswursterhausen Nordderich were at the same time working continuously. The mechanism functioned best after the balloon had reached an altitude of more than 2,000 feet.

The same experiment will be tried with a passenger-carrying airplane. It is declared pilots will be able to avoid storms better when aided by weather charts than with the present written reports.

## Air Services at Copenhagen Increased

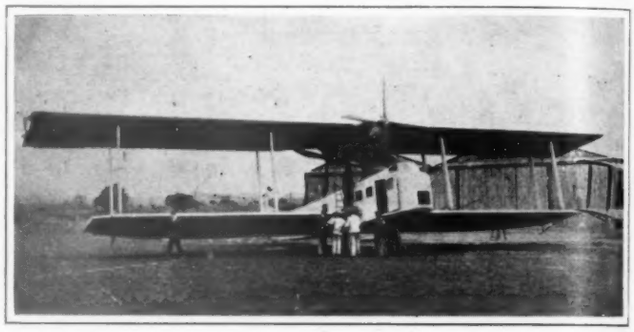
The Danish 1927 flying season opened recently when the Danish Air Transport Co. commenced its Copenhagen-Hamburg service. Swedish and Dutch aviation companies also commenced their traffic over Copenhagen, while the German aviation interests continued their service to Berlin, which has been kept open during the entire Winter. Attempts were made to carry on the Danish service from Hamburg to Cologne, but this did not work out satisfactorily.

It has been decided that the Danish Air Transport Co. will operate over the route Copenhagen-Hamburg only, using the new four motor Jabiru airplanes, capable of carrying 10 passengers, and small Fokker machines with 6 passenger capacity. The Swedish company's airplanes are of the three engine Junker type; the Dutch, Fokkers F. VII A; while the German line planes are Junkers, Albatrosses, Dorniers and Rohrbachs.

With the services offered by the German, Dutch, Swedish and Danish lines, Copenhagen is assured of a sufficient number of daily planes in and out to care for the steadily growing air traffic, both passenger and freight. It is possible to travel from Copenhagen by airplane and reach on the same day the following cities: London, Paris, Brussels, Frankfurt, Munich, Vienna, Prague and Danzig. In two days' travel time the following cities can be reached: Zurich, Geneva, Marseilles, Barcelona, Madrid, Rome, Venice, Budapest, Belgrade, Bucarest, Constantinople and Warsaw. This is made possible by the connections available in Hamburg and Berlin.

## French Still Plan Paris-NewYork Flight

Captain Lindbergh's successful flight from New York to Paris has increased the desire of French airmen to make a flight from Paris to New York in a French plane. Two Trans-Atlantic projects are now being considered; one by



M. Drouhin's Paris-New York plane.

M. Drouhin in a Farman plane; the other by Lieutenant Tarascon in a Bernard machine. Both planes are especially built for such a flight and can be made ready in a short time. They are heavy multi-engined planes of the type which all experts, including Captain Lindbergh himself, consider best for long overseas flights under ordinary conditions.

## Nations to Confer on Classifying Aircraft

An international conference on the classification of aircraft is to be held in Paris, France at the latter part of this month. Seven nations will be represented, Norway, Great Britain, the United States, Germany, France, Italy and Japan. Captain Charles A. McAllister, President of the American Bureau of Shipping, will represent the United States. He sailed June 11 on the Leviathan, accompanied by Professor Alexander Klemin of the Guggenheim School of Aeronautics of New York University, who will serve as advisor.

Captain McAllister said before he sailed that he had been in communication with officials of the Bureau Veritas, in charge of the classification of French aircraft, and that he would present the American viewpoint with the consent of the Government. He also conferred with officials of the Department of Commerce. The proposed plan will be on the lines of ship classification.

## New Douglas Twin Engine Bomber

The Douglas All-Metal Twin-Engine Bomber (T2D-1) was designed primarily for carrier and catapult work. It has interchangeable landing and arresting gear for deck landing. Two Wright P-2 heavy duty aircooled engines are mounted in the wings on either side of the fuselage. No performance data on the plane has been obtained as it is at the present time undergoing test at the Naval Air Station, Anacostia, D. C.

## Anodic Oxidation Treatment of Duralumin

*Cont. from page 1289*

varied from zero to one hundred volts. The generator amperage is based on the surface area of the largest piece to be treated and is such that two to six amperes per square foot can be applied. The voltage being controlled the amperage takes care of itself provided the capacity of the generator is not exceeded.

The bar carrying the anodes is usually a brass rod supported above the tank and suitably insulated therefrom.

In addition to the equipment mentioned as being required for the actual process, a rinsing tank for washing off the acid solution after the treatment is a necessity. This tank should have heating coils, filling and overflow connections, etc. A work table for cleaning the surface of the aluminum or duralumin before oxidation and for painting immediately after oxidation is a desirable feature.

### Free Ventilation Essential

Free ventilation over the anodic tank is essential to avoid any of the ill effects resulting from breathing the gases given off. Where the space is relatively restricted, a hood and blower are considered efficient.

The actual operation of anodically treating a piece of metal is difficult unless the technique is followed carefully. The piece to be treated is suspended in the solution with sufficient material above the liquid level to make a dry contact. The temperature of the bath having been raised to the desired value and the electrical connections having been made, the voltage is raised slowly by cutting out the field resistance of the generator. Heat is evolved due to the current passing through the film on the aluminum or duralumin, and, therefore, to maintain a reasonable temperature in the bath, it is necessary to agitate the liquid and in some cases it may be necessary to use the cooling coils. The applied EMF is controlled during the entire oxidizing period. The operator uses a graph and a stop watch or timer to insure accurate results. The voltage at which pitting commences in duralumin is 67, and if this be approached or exceeded pits and burns will appear on the surface of the metal and the current will run up. There is no protective quality in coatings produced which have been pitted by excessive voltage and current, and corrosion will concentrate at these points when the metal is exposed.

After the required film has been built up on the aluminum or duralumin being treated, the electrical power is shut off and the metal thoroughly rinsed in tap water. Unless this cleaning is done so as to remove all traces of acid, the coating will be stained yellow in spots. This yellow stain is not particularly pleasing in appearance. The washing having been completed the piece is set to dry.

If insufficient agitation exists in the bath, overheating may result with pitting of the material at the liquid level. This pitting is due to the concentration of hot liquid at the surface. The thermometer should indicate the condition, but boiling of the solution will also indicate the same condition. Cooling coils and agitation should be used as is necessary.

### Gray Anodic Film on Duralumin

In order to insure complete treatment of a piece in one immersing various means of carrying the current down can be devised, but it is essential that the anodes be sufficiently large to carry the current and also that all of the anode immersed is aluminum or of the alloy being treated. Insulation will result unless the original oxide film on the alloy is broken so that contact is made with the metal.

The anodic film on aluminum has a blue cast and on duralumin it is gray. In both cases it is relatively uniform presenting a soft glassy semi-opaque appearance. Due to the method of treating by double immersion, about half of the surface being oxidized in each immersion, a band appears at the liquid level on the part which is anodically treated twice. This band is of a rather different color than the remainder of the piece but aside from that no irregularity is believed to exist. No matter whether the metal is treated by a single immersion or by a double immersion, the electrical contact points will not be properly protected. The bare surface is small, however, so special precautions can be taken readily to insure against corrosion there. In the single immersion method a small area of the duralumin also exists which has no anodic treatment requiring special attention to avoid localized action by corrosion in that area.

### Corrosion Staved off Treated Material

The effect on the mechanical properties of duralumin produced by the anodic treatment is relatively minor. There is a slight loss in metal due to the surface being oxidized by conversion of the duralumin itself, and as a consequence there is an actual reduction in weight and in ultimate tensile strength. The loss in weight of some tensile specimens treated was 1 in 1,000 to 1 in 3,000, a negligible quantity. The reduction in ultimate tensile strength on a number of specimens tested was about one percent. There was also a drop in the elongation due to the treatment from say 20% to 18%. This feature is undesirable, but there appears to be no ready cure. Bend tests made show that the original properties of the duralumin in this respect are practically the same after treatment.

Experiments conducted on untreated and anodically treated duralumin show that corrosion is definitely staved off in the treated material for a very long time after the untreated metal has become covered with corrosion. There is nothing to indicate that anodically treated material deteriorates at a more than normal rate after corrosion has begun. However, due to one cause or another, some pitting takes place in sheets treated and subsequently subjected to corrosive influences. This pitting is very marked in thin duralumin causing considerable reduction in strength due to the tearing action when stressed.

Duralumin .008 in. thick in the untreated condition showed numerous holes through the metal due to corrosion after sixty days in the salt spray; whereas, the treated duralumin showed only a very few minor pits after the same period in the salt spray.

Anodically treated duralumin in contact with untreated duralumin in the salt spray showed a sympathetic action on the part of the treated material; but the corrosion in the anodically treated piece was minor, whereas that in the other was great. Untreated rivets in sheets which have been oxidized have a tendency to corrode in the normal manner.

### Far Superior for Application of Paints, Etc.

A number of specimens of anodically treated duralumin sheet about 1/16 in. thick have withstood the action of a salt spray for ninety days without any material corrosion, whereas similar sheets without the anodic treatment were so badly affected they were useless as far as strength was concerned. The anodic treatment benefits annealed and heat treated duralumin alike. In intermittent immersion in stronger solutions the anodic oxidation does not seem to be quite so beneficial.

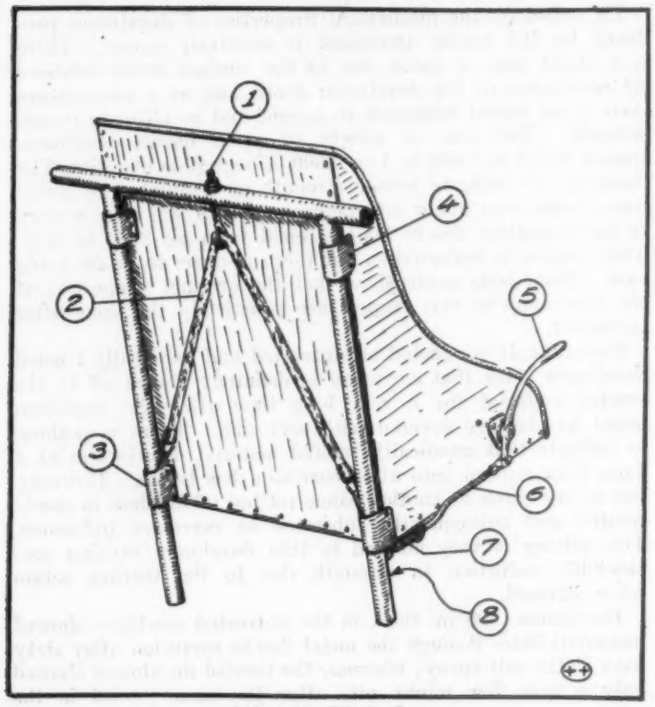
It can be seen from the foregoing on corrosion that some additional means to the oxide coating produced by the anodic process is advisable to preclude any deterioration due to corrosion. Further in any structure assembled from treated material there are bound to be certain areas such as contact points, scratched areas, etc., which have not the protection that exists on the rest of the surface. So, although the whole is not as weak as the weakest part, it is deemed advisable to use some water proofing compound as a supplemental protective medium.

The oxide surface of anodically treated aluminum and duralumin is far superior to the planished untreated metal for the application of paints, varnishes, oils, etc. The adhesion produced is considered better; the bond apparently being made by partial absorption of the preservative applied. This can be readily demonstrated by immersing the treated metal in a bath in which a dye is suspended. This penetra-

*Con't. on page 1317*

## New Adjustable Pilot's Seat

Engineers at McCook Field have recently developed a simple type of adjustable pilot's seat. It is designed to enable pilots of different stature to locate their vision at the proper height. The seat itself is of aluminum alloy sheet with riveted angular joints. The four main sliding guides are of steel plate riveted to the seat. The guides are steel




Adjustable Pilot's Seat.

tubes forming part of the structure of being very directly attached to it. The rubber chord is adjusted to support part of the weight of the pilot so that the seat follows automatically the position selected by the pilot.

To make an adjustment the operating handle must be pulled to release the latch; then the pilot must relieve part of his weight from the seat and should adjust himself to the required position; then the handle can be released and the full weight loaded to the seat. The latch will engage into the hole next to the selected position.

## Bolivia to Subsidize Commercial Aviation

A presidential decree has been signed accepting a contract between the Bolivian Government and a newly-organized air transportation company, the "Companin Boliviana de Transportes Aereos," calling for an annual subsidy of approximately $54,000, to be paid the company in quarterly installments, once regular service is established over at least one of the projected lines. The projected lines are: (1) La Paz to Cobija, with landings at Irupana, Trinidad, Villa-Bella and Riberatla; and (2) La Paz to Sucro.

In return the company has agreed to several stipulations, of which the following are the most important:

1. To establish within one year a regular service of two round trips weekly on at least one of the routes, government assistance being proportionately reduced if regular service is not established on both routes within two years.
2. To construct and maintain landing fields and supply all equipment on its own account.
3. To deposit a guaranty of about $1,666. with the national Treasury at the time of completing the contract formalities, the sum to be returned to the company as soon as regular service of two round trips a week is established over at least one of the routes.
4. To carry first class mail up to twenty-five kilos in weight at the rate of Bs. 2.00 per kilo; to carry official mail free and to allow a rebate of thirty per cent of the passenger tariff to certain government officials.
5. To submit annually a fixed itinerary and tariff to the Government for approval.

## Exporting of Aircraft Products Increases

United States exports of aircraft, aircraft engines, and aircraft parts are showing a consistent increase according to a report made by the Automotive Division of the Commerce Department. Excluding tires, total shipments of these items during 1926 were valued at $1,039,000 which was an increase of almost a third as compared with the 1925 figures. The greater part of this increase was in engines with about eleven times as many units and nearly three and a half times the value of the 1925 shipments. Exports of aircraft, engines and parts during the first three months of this year were valued respectively at $66,650, $78,492 and $209,700. The United Kingdom was our leading market for Aircraft products in 1926, followed by Soviet Russia, Peru, Mexico, and Canada.

The preliminary figures covering aircraft production during 1926 indicates a substantial increase over 1925. There were produced during 1926, 1,253 planes, both land and water type, of which 173 were rebuilt jobs according to a special survey by the Bureau of the Census.

This is compared with a total production according to the Biennial Census of 789 in 1925; 587 in 1923; and 302 planes in 1921, showing a steady growth in production. The year was characterized by the large increase in number of purely commercial designs offered for sale, the unmistakable trend toward air-cooled engines for aircraft power plants, and the encouragement given the manufacturing industry by the adoption of a five-year building program by the War and Navy Departments.

## Canadian Pilot to Try Ottawa-London Hop

Capt. E. L. Janney, formerly of the Canadian Royal Flying Corps, announced recently that he will attempt a 3,000 mile non-stop flight from Ottawa, Canada to London, England, hopping off about June 30. His route, will be from Ottawa to Montreal, thence down the St. Lawrence River to Rimouski and then across the Gulf of St. Lawrence to Trepassey Bay, Newfoundland. From Trepassey Janney will get his bearings and head straight for the south coast of Ireland, whence he plans to fly direct to London.

A radio operator who will have no part in the operation of the plane will be carried by Captain Janney. He has not decided on the make of craft to be used, although it will be a trimotored monoplane capable of carrying ample supplies and equipment for two persons.

Captain Janney expects to make the flight as a part of Canada's jubilee celebration and hopes to arrive in London the following enening, Dominion Day. The celebration will mark the sixtieth anniversary of the signing of the treaty which brought the provinces together under the Dominion Government.

## Captain Wilkins Takes Off From Fairbanks

Capt. George H. Wilkins, Australian explorer, and Alger Graham, Detroit aviator, who are undertaking a new arctic expedition, took off recently from Fairbanks, Alaska for Point Barrow, the northenmost tip of the American continent. From Point Barrow, they plan to fly across the unexplored arctic region north of the American continent in the hope of reaching Greenland, far to the north and east. The "Detroit News II" failed to rise on the first attempt, but eventually succeeded in getting into the air.

The distance from Point Barrow to Greenland is 1,600 miles and Wilkins and Graham face the prospect of spending the summer on the ice and walking out if their plane is forced down. Wilkins hopes to be able to determine whether the fabled arctic continent exists and he will also gather meteorological and other scientific data which may be of value in future arctic aviation. From Point Barrow, Wilkins has laid out an unchartered course through the fogs over the polar ice packs. This route has never been traversed by man although ducks and geese fly in that direction in Spring which gives indication of the possibility of land in that area.

## Anodic Oxidation Treatment of Duralumin

*Cont. from page 1315*

tion on the part of the preservative overcomes one of the greatest difficulties in coating duralumin—that of making the paint or varnish adhere. In addition, it places the protection in a place where the oxide and the coating work together ward off corrosive agents.

From the corrosion point of view the combined effect of anodic treatment and a preservative is an approach toward the ultimate to be expected.

Lanoline, rust preventative compounds, greases, varnishes and paints can all be used effectively on anodically treated parts. The first three can only be regarded as temporary means of protection, whereas varnishes and paints are permanent. Tests conducted in the laboratories indicate that there is little difference between lanoline and greases in the resulting reduction in strength due to corrosion. Sufficient tests have not yet been made to show the best combination of varnishes and paints to use on anodically oxidized duralumin; but the same rules should hold here as have been established for untreated aluminum alloys.

### Practically Eliminates Corrosion

There is one important feature connected with the application of compounds on anodically treated duralumin that will give large returns at small cost. When the metal leaves the bath, is rinsed, and then dried, all the surface is very clean making for an ideal condition to apply paints or varnishes. If a coat is not applied at this time subsequent cleaning and additional cost must be allowed for. It has therefore been found that the application of the primer of the finish used is an ounce of prevention.

Many calculations of cost have been made on the anodic treatment of duralumin or aluminum, but in each case they have been based on experimental apparatus which is usually expensive. A high first cost for proper and efficient equipment results in low operating costs per unit area of material oxidized; and low first cost with inadequate equipment in a high operating cost. With most units, considering the size of material being used in aircraft, the anodic oxidation cost should not be greater than a few cents a square foot of area and double that figure per pound.

The greatest stumbling block of those using duralumin in aircraft structures has been corrosion. The anodic process has in a measure removed this difficulty, and bids fair to be the forerunner of the better means of protecting the metal in service. It should eventually be even more important as a protection for duralumin in the aircraft industry than galvanizing has been for the prevention of corrosion in steel.

## Austin Meets Hangar Problems

The growth of commercial aviation has called for a relative development in terminal construction, housing, maintenance and servicing of planes. The Austin Company, of Cleveland, Ohio, have endeavored to keep pace with this expansion and for the past ten years have kept abreast of all the latest developments in the aviation field.

Austin engineers, working for the construction of standard types of hangars, have given careful study to the advantages and disadvantages of the various kinds and have acted as advisers to corporations and municipalities contemplating an airport or facilities for the shelter and care of aircraft.

The Austin Company have designed and constructed hangars for some of the leading aircraft manufacturers of the country.

## Plane Flies Over Washington's Route

A de Havilland airplane flew from Fraunces Tavern, New York City, over the Long Island communities through which Washington passed, on May 18, and back, the plane making the trip in 1 hr., 32 min. Washington in a coach and four took seventy-eight hours to complete the journey.

The plane was piloted by Lieut. Newman R. Laughinghouse and Lieut. Orville L Stephens was in the plane as observer. The machine passed over Brooklyn, Jamaica, Hempstead, Amityville, Sayville, Setauket, Smithtown, Huntington, Roslyn and Flushing.

## Gliding Records

Ferdinand Schultz on May 3, at Passitten, East Prussia, Germany, established a new World gliding record, for a one-seater glider, when he remained in the air for 14 hr., 8 min. The former glider record was held by Massaux, a Frenchman, who remained in the air 10 hr., 43-2/5 sec.

On May 15, Schultz added a new record to his list by covering an airline distance of approximately 39 mi. without landing. He started at Rossitter Field, Koenigsburg, where an engineless plane meet was being held. The new record exceeds the old one by more than 5 mi.

## New American Eagle Distributors

The American Eagle Aircraft Corporation, of Kansas City, Mo., have made the announcement that R. M. Brooks, of Dallas, has been appointed their Texas distributor and L. M. Tucker, of Detroit, their agent in Michigan.

The new Swiss plant of the Dornier-Melatlbauten Airplane Co., across Lake Constance from Friedrichshofee. Here is to be built the super Wals to carry from 50-100 passengers.

# FOREIGN AERONAUTICAL NEWS NOTES

By Special Arrangement with the Automotive and Transportation Divisions, Bureau of Foreign and Domestic Commerce

## *Survey of Imperial Airways*

The erection of the hangars and the administration block at Croydon airdrome is proceeding satisfactorily. Hangar A is nearly complete. Hangar B is expected to be ready for occupation in the early Autumn of 1927. The steel framework and wall foundations of the administration block are complete and the walling and flooring are well in hand. Demolition of the buildings in use will commence as soon as the new buildings are ready for occupation. In connection with the Air Ministry (Croydon Aerodrome Extension) Act, 1925, the work on the new road is practically complete and Plough Lane will be closed to traffic, other than traffic proceeding to the aerodrome, some time in 1927. Proposals are under consideration for the erection of a hotel on the northern side of the administration block, and negotiations are proceeding satisfactorily.

At Heliopolis, the R.A.F. aerodrome, wireless station and meteorological station are being used, and the Air Ministry has provided a hangar and workshop and stores accommodation. At Gaza a new aerodrome site has been acquired by Imperial Airways, Ltd. The Air Ministry has provided a hangar and a wireless and meteorological station to be operated by the company, who have, in addition, erected accommodation for their passengers and staff. At Ziza the Royal Air Force landing ground is being used but no facilities are provided, other than bulk gasoline store and picketing arrangements by Imperial Airways. Wireless and meteorological service will be provided by the Royal Air Force Station at Amman. At Rutbah Wells a landing ground has been prepared. This post is equipped with a wireless station and the Iraq Government will provide a wireless and meteorological service for aircraft. Bulk gasoline storage and picketing arrangements have been provided by the company. At Baghdad West, the Royal Air Force intermediate landing ground has been equipped as an aerodrome, and a hangar has been provided by the Air Ministry; accommodation for personnel has been provided by Imperial Airways, while the wireless and meteorological service will be provided by the Royal Air Force station at Hinaidi. At Shaibah (Basra,) the R.A.F. aerodrome, wireless station and meteorological station are being used. A hangar has been provided by the Air Ministry and accommodation for personnel has been provided by the company. The organization in the Persian Gulf is still under consideration, but at Karachi the Indian Government has assumed responsibility for the provision of the aerodrome and the necessary ground organization, consisting of hangar and wireless and meteorological stations. The site selected is on a portion of the airship station. Work is proceeding both on the part of the Indian Government and Imperial Airways, Ltd., who as at other stations, are providing accommodation for personnel and gasoline storage. An officer of the Civil Aviation Department was appointed superintendent of the route and took up his duties in November.

Definite steps are being taken regarding the continental air route. It is becoming more and more evident that the Neon form of beacon will prove the most suitable for air navigation, and in time it may be necessary to substitute beacons of the new type for the existing lights with optical systems. Preliminary experiments with a Neon tube sunk in the ground at Croydon aerodrome are in hand, and experiments are being instituted with a view to producing an automatically controlled generating plant for the operation of Neon beacons in situations where current is not available from local sources of supply. The outcome of these experiments may have a considerable bearing on the lighting of the Egypt-India air route.

Arrangements are being made for the control of the obstruction lights on the wireless masts at Croydon by means of a sun valve, an arrangement which may later be extended to the lights on other W/T masts. The floodlight at Croydon aerodrome is to be converted into a mobile unit, using a Kegresse tractor mounting an electric generator. The arc lamp will be replaced by a new design of gas-filled lamp now being evolved, which gives equal illumination and greater reliability with a considerable reduction of working cost. Suitable lighting systems are being devised for the illumination of wind cones and ground signals.

Work is in progress on the unmasking on the landward side of the marine lights at Dungeness and South Foreland, in order that they may be of assistance to aircraft flying towards the coast from inland.

The International Commission for Air Navigation has adopted the new rules, effective Jan. 1, 1928, with regard to the examination and carriage of licensed navigators. Examinations based on the new conditions have been continued, and further lectures in navigation and meteorology given at Croydon aerodrome.

Work is progressing on the construction of the new wireless stations at Croydon aerodrome. The aerodrome wireless station at Lympne has been re-equipped with modern apparatus, including a direction-find receiver of the same type as that in use at Croydon, and work is progressing on the modernization of the Pulham station. The stations at Croydon, Lympne and Pulham maintain a constant watch for aircraft from dawn to dusk and are always ready, during this time, to render immediate direction-finding assistance to any aircraft upon demand. The cost of these three stations for personnel and maintenance is approximately £10,000 annually.

The Air Ministry civil aviation wireless station at Longerich Aerodrome, Cologne, was closed in August upon the opening of a German station capable of performing the same duties.

A chain of wireless stations between Cairo and Karachi, comprising existing R.A.F. stations and additional Air Ministry civil aviation stations, has been organized and will be ready for service when the route is opened.

Arrangements for the supply of meteorological information remain unchanged, except for improvements. A new feature, which was introduced in October, is the issue of altimeter correction charts to pilots flying from Croydon, on days when the error due to atmospheric conditions is likely to exceed 200 ft. and when fog or low cloud exists or is likely to develop on the route. A new system of ground signals, conforming to the scheme recommended by the International Commission for Air Navigation, was brought into operation at Lympne aerodrome in July. Another improvement is a pictorial method of exhibiting at Croydon aerodrome the hourly weather reports from stations on the air routes. The hourly reports of visibility over the Channel received from the coast-watching station at Hythe were discontinued on Sept. 1, and replaced by similar reports from Dymchurch. The arrangements for the supply of meteorological information on the Southampton-Guernsey air route have continued on the lines of the preceding year.

# Side Slips

By ROBERT R. OSBORN

There is one little experiment we'd like to perform, using Captain Lindbergh as the subject. Sometime, in the midst of one of the numerous large banquets in his honor, we'd like to come up in back of him, shake his shoulder vigorously and say, "Better get up and dress, Old Man. The weather reports are very favorable and conditions ideal for your New York-to-Paris flight." We'll bet he'd jump up and say, "By George, I knew this must be a dream I've been having all this time. Everything was too good to be true and I knew some one would wake me up after a while. Tell them at the field to drag out the ship and I'll be ready in a few minutes."

• • • •

In order that the home-coming of the popular captain may be as pleasant as possible, we hope that some sort of a committee will be appointed to keep him from seeing any of the pictures of himself which have been sent over here by wire, or any of the rapidly sculptured busts which are supposed to resemble him. It seems that there is always something. Right after Commander Byrd's successful flight to the North Pole we had to establish The Society for the Aeronautical Education of Artists and Custodians of Fund for Retiring All Jennies at Ten Years of Age, in order to get some improvement in the pictures appearing in the newspapers and magazines which were supposed to represent airplanes. Just when our work with the artists and illustrators was beginning to bear fruit, the electrical engineers and sculptors start more trouble for us. Sometimes we think we'll leave the saving of aviation to some one else.

If completeness of primary training has anything to do with flying ability, we can understand why Captain Lindbergh has turned out to be such an able flier. Since his notable accomplishment in flying to Paris we have met three men and have read about some fifteeen more who taught him to fly. Having taken post-graduate courses in flying from so many institutions, he certainly should have been able to make that flight.

He compares in popularity with a certain young lady we could name, who spends each summer at the sea-shore and who has been taught to swim about four times each summer for the last seven years.

• • • •

Mr. G. S. I. reports that while on a visit to the All-American Aircraft Display in connection with the recent Pan-American Congress he met a man who introduced himself as being quite prominent in the industry. When he was asked whether or not he had flown in a certain plane he said, "Certainly not. I don't fly. I am an aviation executive."

Using this clue furnished by Mr. G. S. I., we have placed our complete corps of trained investigators on the case, in an effort to determine just what the functions, if any, salary, office hours, etc. of an aviation executive might be. The advertisements in the mechanical magazines of the popular variety, state that there are great fortunes to be made in commercial aviation. Merely being able to read blue prints is supposed to bring in $60 to $100 per week and from this low position the salaries run on up through airplane mechanic, airplane constructor, airplane superintendent, aeronautical engineer to airplane manufacturer in which "unlimited profits" can be attained. Training to be an "aviation executive" is not included in the correspondence courses offered, but in comparison with these other positions the title should rate at least $30,000 a year and hours from 11 a.m. to 1 p.m. with two hours off for lunch.


# Who's Who
## IN AMERICAN AERONAUTICS

**1925 EDITION**

## The BLUE BOOK of AMERICAN AIRMEN

*Contains One Thousand Biographies of*

Aviators, aeronauts, aeronautical engineers, aircraft manufacturers, flying officers of Army, Navy and Marine Corps, Air Mail personnel, aircraft accessories manufacturers, flying field owners, American aces, aeronautical instructors, inventors, National Guard air officers, aeronautical writers, sportsmen, men prominent in aeronautical affairs.

*Two Hundred Illustrations*

**Price $2.00**

**POSTPAID**

**AVIATION PUBLISHING CORP.**
**250 W. 57th St., New York**

Enclosed please find Two Dollars for copy of Who's Who in American Aeronautics.

Name .....

Address .....

City .....

# AIRPORTS AND AIRWAYS

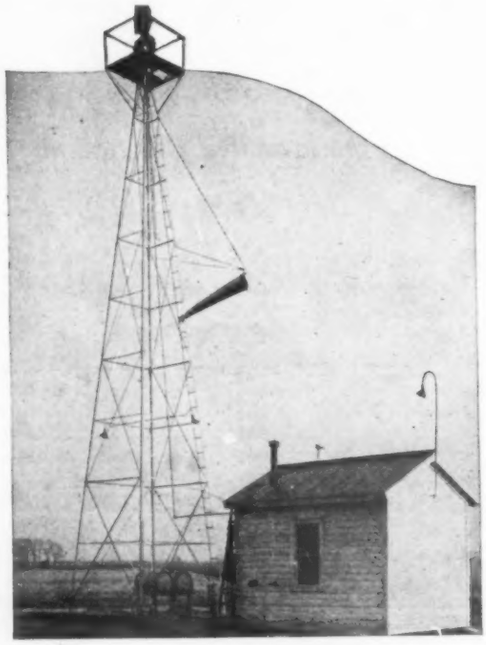
## Moline, Ill.

Moline is geographically situated in the center of a group of four municipalities, all on the banks of the Mississippi river, with a combined population of 175,000. To the north is Davenport, to the west, Rock Island and to the east, East Moline. These four cities are generally referred to as the Quad-Cities. The Moline Airport is situated three miles south of the city, on a paved state road. Framing Field, the site of the Moline Airport, is ideally located as a flying field. It consists of a tract of 120 acres of level land, well drained, with a subsoil of gravel, and covered with thick matted grass. It is free from natural obstacles that would make the taking-off and landing of planes dangerous. Due to these natural advantages, it was selected as a control point for the first Coast-to-Coast Flight in the Fall of 1919.

In 1919, E. K. Campbell and Roy McElvain flew into Moline, landed their planes in a pasture on the Midvale farm, below Prospect Park. They stayed two days and did a thriving business carrying passengers. During 1920, Gustaf De Schepper started taking instruction at Wallace field, Bettendorf, Iowa. When he made his initial flight, April, 1922, he was the first Moliner to become an active civilian pilot. In 1922, a small field was rented along Colona Ave., on the Weaver farm. Wesley Smith became the instructor, soloing Floyd Ketner, the second Moliner to become a full-fledged pilot. Dr. C. C. Sloan then became interested and soloed under Wesley Smith. Al Hedlund completed his training about the same time.

The citizens of Moline soon realized that the Colona Ave. field was too small for safe and successful airplane operation, and in November, 1922, 30 acres of Framing Field were leased, De Schepper, Ketner and Dr. Sloan forming a partnership. A three-plane hangar was erected and later a single-plane hangar for Ketner's plane was built. Wesley Smith went East in 1922 to become associated with another aeronautical enterprise. The following year E. K. Campbell was invited to take charge of the field. He returned to Moline in the Fall of that year with his mechanic, Roy R. Quinby. In the Spring of 1924, aviation activities began in earnest. A Laird-Swallow was purchased. It carried two passengers. In the same year, a Thomas Morse, rotary-engine, single-seater scout plane was added by Gustaf De Schepper. Another hangar was erected at Framing Field during the Fall of 1924 for a new Standard, bringing the total planes to five. At the same time a long lease on the entire field was acquired. A newly paved road was built past the field, facilitating access to the airport. Along this road, a filling station and a substantial new hangar, 54 by 46 ft., were erected. A 60 ft. well was drilled, to provide a permanent water supply, and an electric light plant installed.

Air mail for Moline had long been hoped for and much propaganda had been carried on to that end. At a meeting of the N. A. T. officials and the Aviation Committee of the Moline Chamber of Commerce, the details were gone into thoroughly. The Campbell-De Schepper Company agreed to

SPERRY
Air Beacon

NINETY Sperry 24-inch Revolving Beacons are guiding air mail flyers safely over five Airways. SIXTY more Sperry Beacons are being manufactured, making a total of 150 ordered by the Department of Commerce during the last fiscal year.

Airports must provide their own Beacons. Be sure you get the best—a Sperry Beacon.

*Write for Bulletin*

THE SPERRY GYROSCOPE COMPANY
MANHATTAN BRIDGE PLAZA, BROOKLYN, NEW YORK
*Contractors to U. S. Army, Navy, Air Mail, Coast Guard and Department of Commerce*

put their field at the disposal of the N. A. T. free of charge for one year. The Chamber of Commerce agreed to provide the hangar required for the storing of an emergency mail plane, together with the necessary office and repair facilities. Before Col. Paul Henderson and his party left the city, the contract for the building had been signed and the funds had been pledged.

The N. A. T. ordered ten Carrier-Pigeon planes for the Chicago-Moline-Dallas route. The first one reached Moline Feb. 23, 1926. The other planes followed shortly. On Wednesday, May 12, the air mail service was inaugurated. In November, 1926, the N. A. T. signed a contract with the American Express Co. for the transportation of packages by plane from New York to Chicago overnight, and thence to Moline and Dallas. This new service is scheduled to start during 1927. On November 10, 1926, the N. A. T. started passenger service with a Ford-Stout all-metal monoplane, powered with a Wright Whirlwind engine. The plane arrived in Moline with a full complement of passengers, among them its builder, W. B. Stout, and Colonel Henderson.

The Moline Airport is thoroughly equipped to train students. The school is open all the year. Ample opportunity is given students to acquaint themselves in the ground school with the mechanical details of engine and plane. A well-equipped shop, with expert service, is at the disposal of cross-country fliers at all times. Gasoline and oil can be obtained in any quantity. A plane and a pilot are available at all times for aerial photography, whether for industrial or survey purposes. Cross-country trips can be arranged for at any time, at the option of the prospective traveler. Regular trips were inaugurated in 1927 between Moline and Chicago. A six-passenger Travel Air cabin monoplane, with a Wright Whirlwind engine, is used. The plane leaves the Moline Airport at 7:00 a.m., arriving at Chicago at 8:40. It leaves Chicago for its return trip at 6:00 p.m., daylight saving time, or 6:40 p.m. Central Standard Time.

**Houston, Tex.**

Five thousand people came to the Bellaire Field, of the Houston Aerial Transport Company, recently to witness the air transport demonstration. Roger J. Seaman, assistant general manager of the Houston Chamber of Commerce, opened the program at 3 p.m. He announced through the amplifiers which had been provided that the demonstration was threefold: To demonstrate the safety of air transportation; to make the citizens of Houston acquainted with the plans to provide Houston with a municipal airport and to make an air mail object lesson to increase the tonnage in and out of Houston.

Roy B. Nichols gave a description of air mail purposes and possibilities and Capt. Fred S. Wilbur, chairman of the program, then opened the events.

Major Walter H. Reid, Commanding the 36th Division Air Service, flying a huge O2C Douglas observation plane from Ellington Field, winged his way down to a landing in front of the crowd. The words "Air Mail" were painted in white on the fuselage of the plane, which was met by a mail truck from the post office and loaded (theoretically) with a cargo of mail for Chicago and New York. Taking off, Major Reid flew around the field and returned, unloading a consignment of mail for Houston from New York and Chicago. Capt. Frank Hawks of the Raymond Pearson Aerial Company explained through the amplifiers that air mail from Houston to Chicago consumed but 12 hr. and to New York 24 hr.; that is, letters mailed from Houston by air mail would be delivered in Chicago in practically the same length of time it requires for railroad mail service from Houston to Fort Worth, and air mail to New York in the same time as railroad mail from Houston to St. Louis.

The plane flown by Major Reid was a 12 cylinder 400 hp. Liberty engine capable of 140 m.p.h. high speed and 120 m.p.h. cruising speed: It carried 172 gal. of gasoline, sufficient for 7½ hr. sustained flight.

*Mr. W. A Mara, Secretary of the Stinson Aircraft Corporation, wearing a suede Gordon Aerotogs Jacket.*

Gordon AEROTOGS

## "Remarkable service and comfort"

*W. A. MARA--*

"YOUR wonderful suede jacket has kept me comfortable on many gusty trips," writes Mr. W. A. Mara, Secretary of the Stinson Aircraft Corporation. "The jacket is particularly suitable for flying. . . Its light construction allows for freedom of movement and eliminates the bulky sensation connected with overcoats and sweaters."

Gordon Aerotogs include flying suits; fur-lined leather coats and jackets; leather and fur helmets; vests, gloves and mittens. Carefully made from the finest materials. Recommended by leading pilots everywhere. Ask your dealer about Gordon Aerotogs, or write to Gordon and Ferguson, Inc., Saint Paul, Minn.

# ALL METAL

## *Planes and Parts*

IN THE design and construction of several types of all metal airplanes, I have originated duralumin shapes and methods of fabrication which have materially reduced costs and weights and increased performance and strength.

I AM NOW able to offer to engineers, designers and manufacturers a line of special patented duralumin stampings, and drawn parts to meet their individual requirements, such as pulley housings, fairing sections, metal seats, floors, control columns, pedals, interplane and drag struts.

A FAIR licensing plan under which a manufacturer may himself produce special parts under my patents is also available.

MY EXPERIENCE and complete engineering—manufacturing facilities are now offered for either or both the design or construction of complete all metal airplanes and seaplanes for special military, or commercial purposes.

*Contractor to the U.S. Navy*

CHARLES WARD HALL, INC.

156 EAST 42ND STREET NEW YORK

Only the practical utilities of air transportation were demonstrated, i.e., the now generally accepted use of airplanes for the transportation of passengers, mail, express and freight, and as adapted and applied to industrial uses.

An unheralded event was the taking off for Galveston of the huge Fokker monoplane, a five-passenger cabin-enclosed machine, with passengers going to the Island City. This huge craft was piloted by Joe Ben Leveri, one of the oldest in experience and best known airmen in the United States. This plane arrived at the Bellaire Field the previous day from Fort Worth with Underwood Nazro, vice-president and general manager of the Gulf Production Company and Bill Dunning, Jr., an independent oil man of Fort Worth. The spectators were given the opportunity of closely inspecting this great passenger plane, marveling at its speed, strength, beauty and Pullman car conveniences. Mr. Seaman used the visit of this great plane as an object lesson crying for the need of a municipal airport in Houston to properly house and care for transient air travel.

The practical industrial uses of the airplane in aiding the agricultural needs of the country were forcefully demonstrated by cotton dusting planes of the Tips & Smith and the Quick Aerial Companies. An airplane duster, carrying 400 lb. of dusting compound, swung back and forth across the field and close to the crowd where a good view of the demonstration could be obtained, spraying the dust. It was explained that an airplane could dust as high a 1000 acres of cotton a day, whereas hand help and mules could do little better than fifty acres.

"Dead stick," or dead engine landings were demonstrated by Pilots J. C. Davis, Clyde Spracher and J. F. Van Lue.

The parachute demonstration was greatly enjoyed. It was a safety exhibition, the parachute wearer, Capt. Frank Hawks, standing in the propeller blast of a plane blocked to the ground and pulling the chute rip cord. The air current from the propeller opened the chute exactly as it would open if the wearer had leaped from a plane in mid-air. The huge silken folds of the chute opened and billowed out in close view of the spectators who were thus enabled to closely observe the mechanism of the chute and its operation.

A smoke screen exhibition and demonstrations of the common causes of airplane accidents by Captain Hawks in the Pearson Travel Air plane closed the program.

## Florence Airport, Florence, S. C.

How itinerant fliers with modern three place light commercial planes, are piling up mileage and hours in the air, and in most cases good profits as well, is illustrated in the case of Howard Stark of Pawling, N. Y.

Pilot Stark who for several weeks has been flying passengers from this field, recently completed in his Waco OX5 a tour of the Atlantic Coast states from New York to Florida, across the Gulf to Cuba and back to South Carolina, covering during his nine months trip approximately 21,000 mi. in 300 hr. in the air. Flights of 100 mi. each way between Naples and Miami, Fla., over the Everglades, and 150 mi. between Naples and Key West over swamps and water, where no landings were possible were made without difficulty in his Waco.

Stark expressed himself strongly on the lack of a landing field at Key West. In describing his arrival at Key West, he says: "I picked out an old wartime seaplane base where they pulled up the ships for repairs. It was grown up with bushes. I got in O. K. thanks to my ship."

From Key West Stark flew to Havana, Cuba, over 100 mi. of water. His flights in the Island republic covered the entire country and totaled about 2,000 mi. Returning Stark again flew across the Gulf, stopping at Key West and Miami, Fla., Savannah, Ga., and Florence, S. C. It is claimed for Stark that his flight to Cuba and back in a Waco OX5 is the first in a land plane.

**PROFITS FROM PASSENGER CARRYING ARE LARGE PROVIDED YOU CAN GET THE PASSENGERS. THE WATER IS THE NATION'S SUMMER PLAYGROUND. YOU CAN MAKE EVERY PLAYGROUND YOUR LANDING FIELD IF YOU EQUIP YOUR PLANE WITH METAL FLOATS.**

**Waco-9 owned and operated by the New England Aircraft Co., equipped with duralumin floats manufactured by**

**EDO AIRCRAFT CORP.**
**College Point, Long Island, N. Y.**

*The Aeroplane*

Published Weekly

175, Piccadilly, London, W.1
England

CHARLES GREY
Editor

Subscription Rates
for U.S.A.

1 year—$8.50

**Denver, Colo.**

J. A. McInaney, Eaglerock sales manager and his brother Mike returned Wednesday from a 1600 mile trip via Eaglerock. They flew to their old home in Pelican Rapids, Minn., and had a very pleasant visit with their parents. J. A. took his parents for a hop and recalled the fact that he had taken them for their first automobile ride about sixteen years before. They admitted that they were much more nervous in the old two cylinder Brush than they were in the Eaglerock.

L. H. Scott, Eaglerock dealer for West Virginia and Southeastern Ohio, had a few thrills on his way back to Marietta, Ohio. He ran into the tail end of a cyclone down in Kansas and stayed in the air until it was almost dark, then landed. He had to sit on the ground with the engine at almost full throttle for very nearly three hours until someone showed up whom he sent for help. About fifteen men helped him run the plane up to a barn and hog-tie it to some tractors.

James S. Charles demonstrated the Eaglerock at the Aircraft Display in Washington, D. C. He has already gotten results from it and through his efforts Maryland and Eastern Pennsylvania have been allotted to Mr. E. W. Robertson, Alexandria, Va. Mr. Robertson has a number of contracts for aerial photography, etc., to fulfill, so will not be able to come in for his demonstrator for about three weeks.

Sunday and Monday, May 29 and 30, the Colorado Airways, Mail Carriers, 120th Observation Squadron, put on a spectacular two day celebration of the first year's activities at their airport.

Ray Steinhart, wing walker, furnished his usual number of thrills and Norman Lee of Colorado Springs, put on an impromptu parachute jump late in the afternoon, Sunday. As Lee's chute snapped open, a ring in the harness struck him in the head, dazing him and causing him to land heavily. He was treated for slight bruises, but was otherwise unhurt.

The show opened with three Jennies from Lowry Field circling overhead in formation, led by Maj. Bruce Kistler. The next feature was stunt flying by Jack Euler. Shortly after he landed, three Eaglerock planes came winging their way from the Alexander Airport on the first lap of their race, won by J. Don Alexander, president of the Alexander Aircraft Company, who flew against J. A. McInaney and F. E. Deagle in the other two planes.

On Monday, a similar series of performances were put on before a crowd of about 30,000 people. Cloyd Clevenger, chief pilot and instructor at Alexander Airport, was the feature of the day. In a new Eaglerock plane he thoroughly tested same for imperfections before the eyes of the onlookers.

May 27, J. A. McInaney and Cloyd Clevenger flew from the Alexander Airport in a race to obtain first stories and pictures of a mine disaster 200 miles south of Denver. The race was won by Cloyd Clevenger.

**Cincinnati, Ohio**

By R. Alvin Hug

The new Waco 10's which have been in operation at Lunken Airport for several months have proved a revelation to everyone connected with the flying game. The streamline effect of the new Waco makes it a beauty, and together with its improved flying characteristics it has won the hearts of the pilot. The Embry-Riddle Company sold twenty-six Waco-9's during 1926, but present indications are that this record will be shattered before the end of the year because of the heavy demand for the new Waco-10. The Embry-Riddle flying school is very active now that Summer has arrived and a large number of students are taking instructions. Nearly a score have already been soloed since the first of the year.

The Reserve Officers stationed at Lunken Airport have had a new and excellent plane added to their fleet—a Consolidated Trusty with 180 hp. Hisso engine.

Lieut. Hugh Watson has ushered in a very promising season at Grisard Field, Blue Ash. He has added two new modern planes to his fleet, an OX-5 Travel Air and a 180 hp. Hisso Travel Air. This latter has proved to have exceptional speed and Watson has been giving spectators many thrills


# LIFE INSURANCE
## *for Those Who Fly*

*Full life insurance for those who fly has been a long felt want, and we have much pleasure in announcing that we are now in a position to supply this essential coverage.*

***Write for particulars***

—

Constructive total loss
Accidental Damage
Fire, Tornado, Theft
Cargo (direct and liability)
Damage to ground property

Public liability
Property Damage
Passenger liability
Personal Accident
Compensation

***Lowest Rates***
***Broadest Coverage*** ***Highest Indemnities***

BARBER & BALDWIN
*Underwriting Agents*
285 MADISON AVE., NEW YORK
TELEPHONE: Ashland 9373

**Airplanes - Motors - Flying Boats - Supplies**

Dandy new model 40 Aeromarine flying boat complete with OXX6 motor, radiator and propeller $2550., or less motor, radiator and propeller $1800—no nicer condition boat available anywheres. New JN4D airplane splendid condition $1250. Slightly used Curtiss JN4D airplane good condition throughout $875. Good used Canadian Curtiss $695.

New OXX6 100 H.P. Curtiss $600. or Navy overhauled $375. Gov't spec. cotton cloth 50c yd. or 50 yds. or over 49c yd. or 100 yds. or over 48c a yd. 5 gal. fresh nitrate dope $8.50, or 25 gal. or more at $1.40 or 50 gal. bbl. $67.50. Grade A cotton tape scalloped 5½c yd. or 100 yd. rolls at 4c yd.; ordinary cotton tape scalloped 4c yd. or 130 yd. rolls at 3½c yd. No. 7 rib cord 1c yd. or $3.00 lb. 14″ single pointed needles 50c, 10″ double pointed needles 35c, curved needles 35c.

Canuck or JN4 upper or lower wings, covered $90. each; Standard lower wings, covered $90 each. Crating additional at cost. 26 x 4 dandy unused tires $7.50 or slightly used ones $5.00 or moderately used ones $3.50. 26 x 4 new tubes $2.25. 750 x 125 tires dandies $10.00 or unused passable $7.50. Unused surplus tubes $1.75 or new production tubes $3.50.

All parts for JN4D, Canuck, J-1, Standard, OX5, OXX6, and some Hispano, Liberty, LeRhone, Fiat, Lawrence, Clerget, and Mercedes parts. *Everything for aircraft. Send for aviation catalog.*

FLOYD J. LOGAN AIRPLANE CO.
716 W. Superior Ave. Phone Cherry 0949 Cleveland, Ohio

# TO MAKE AMERICA FIRST IN THE AIR

**IS THE PURPOSE OF THE**

**National Aeronautic Association**

***In this effort it merits and invites YOUR cooperation and support***

**Regular Membership $5.00 per Year**

**NATIONAL HEADQUARTERS**
**1623 H. Street, N.W., Washington, D. C.**

with it. A feature of every Sunday afternoon at Grisard Field is a parchute jump by P. A. DeWeese, who so delighted the crowds last year that he was brought back by popular demand.

Hugh Watson together with his brother, Parks, and DeWeese established a record in obtaining a picture of the Kentucky Derby for the "Cincinnati Enquirer." After snapping a picture of the finish with an aerial camera, Watson opened the throttle of the Travel Air and reached Cincinnati in 47 min. In order to save time, DeWeese took the picture and jumped with his parachute as the plane passed over Maketewah Country Club and delivered it to a representative of the "Enquirer" waiting in a nearby auto, thereby establishing a new speed record for the transmission of an aerial photo.

Watson is conducting a flying school in addition to his other activities and has several students on the roster. The training plane was overhauled and recovered during the Spring months by Parks Watson and his corps of assistants and put in first-class shape for what is expected to be a long and successful season. Although there were more passengers carried at Grisard Field during 1926 than the two previous years combined, indications are that the 1927 record will even eclipse that of last year. Grisard Field has become a rendezvous for all those who wish to spend a pleasant Sunday afternoon in the open and cool themselves off by taking a trip through the clouds.

### Oklahoma City, Okla.

By Ernest W. Fair

There seems to be little doubt in the minds of anyone but that Oklahoma City is to be a leader in commercial aviation. Development after development, each greater than the other, is being furthered in aviation circles here.

The Oklahoma Flying Club, but recently organized, is doing its part in the development of the state and city. It now has after four months of organization, about forty members, some of whom are high school boys who are greatly interested in aviation. The club held its first circus May 14 which was attended by about 2000 people. A flying circus and an exhibition of planes constituted the program. Formation flying, races, wing-walking, parachute jumping and dead engine landings were features. Four types of commercial planes were exhibited: the Swallow, Eaglerock, Travel Air and the plane of Bob Tarbutton which he has made himself. Some of the pilots who took part in the show were Al Henley, Burrell Tibbs, Bob Tarbutton, Bill Quillin, Frank Hoover and Roy Schlemeyer.

Al Henley, Frank J. Quillan and a few others have organized the Oklahoma Airways Co. Henley was formerly at Kelly Field as an Army pilot; Quillan is the Fourth Ward Councilman of Oklahoma City, grocery merchant and director of the Stockyards National Bank. His son, Bill, is flying at the field and interested in the company also.

There have been many visitors here in the past month. A squadron of bombers en route to the air maneuvers at Fort Sam Houston, Tex., stopped over the week end at Oklahoma City and attracted many of the citizens to the field.

L. D. Setmour, chief engineer of the National Air Transport Co. was a visitor here last week inspecting work at the local mail field.

Aviation fans are looking forward to June 27 when Major Herbert A. Dargue, commander of the Pan-American Good Will flight, will visit Oklahoma City with his Loening Amphibian plane "The New York". Walter O. Lochner, president of the National Association of Commercial Organization Secretaries, is to come with Major Dargue.

Burrell Tibbs, through the Tibbs Flying School, has just sold two planes. One, a new Swallow, was delivered to Ira Edgards of Fairview, and the other a Standard, was sold to D. F. Williams of Carnegia.

Tibbs, who is president of the Oklahoma Flying Club, is planning some Summer circus work for Oklahoma City and would appreciate the help of other fliers from other towns in pushing the club's activities forward.

**PRIVATE OPERATORS** made the discovery that airplanes engineered to meet the exacting requirements of the **POST OFFICE DEP'T.** were more economical to keep up and operate than many so called, "Commercial Ships."

Considering that the initial cost was no higher, it was well worth their time investigating the superiority of **RYAN M-1.**

RYAN M-1 MAIL PLANE OVER SAN DIEGO, CAL.

**RYAN AIRLINES — SAN DIEGO.**

# Flying Gear

A complete line of air-wear for pilot and passenger in any climate and every season.

Stores in all principal cities.

A. G. Spalding & Bros.

105 Nassau Street, New York

# DOPE

THE MOST ECONOMICAL SCHEME YET PRODUCED.

# TI-TWO

REGISTERED TRADE MARK

MADE BY

**TITANINE, Inc.**

**UNION, UNION COUNTY, N. J.**

*Contractors to U. S. Government*

## Visalia, Calif.

Recently the Visalia, California Municipal Airport was formally opened together with the "christening" of the first locally owned airplane. The plane, an Alexander Eaglerock stock biplane, was recently purchased by Ed. F. M. Deeds and Sol Sweet from W. L. Lamkin, Eaglerock distributor for Northern California. The plane to be operated by Deeds and Sweet is the first to be operated from Visalia and created much interest in the community. The plane was offered to the Sheriff's Department and accepted by Sheriff Hill to be used in emergencies requiring speedy transportation.

The new Visalia Airport, 80 acres in area, is centrally located on the main State Highway at an important intersection and only four and a half miles from Visalia. Visalia is exactly half way between Los Angeles and San Francisco, and it is expected the new airport will attract much air travel. An excellent machine shop with qualified mechanics in attendance is also a feature. The Airport will soon be equipped with lighting facilities and at present is well-marked.

Sweet and Deeds are specializing in aerial photography and instruction work and will soon complete a hangar to accommodate two planes. All planes passing through the San Joaquin Valley are cordially invited to "set down" at the Visalia Airport, where they will find service with a capital S.

## Mullen Lanken Airport

The Story-Eaglerock Sales Co., of Tacoma, Wash., distributors in West Washington and West Oregon, of the Eaglerock airplane, manufactured by the Alexander Aircraft Co., of Denver, Colo., are now establishing a flying school. F. A. Morton, a well known commercial pilot, will have charge of instruction. The company will also engage in aerial photography, using the Eaglerock plane exclusively in the work.

J. B. Story is the manager of the company. The field at Tacoma is known as the Mullen Lanken airport and is located three and a half miles south of the center of Tacoma, on the Pacific Highway. It was formerly the location of the Tacoma Speedway. Hangar and other service can be obtained by visiting pilots, who are invited to make this their headquarters. The field is sodded.

## Spokane, Wash.

By E. Harve Partridge

Spokane, Wash., which will be the scene of the 1927 national air races and the terminus of a 3300-mile cross country race from New York City, and another shorter race from San Francisco, is one of the centers today of American aviation. Known as the "Queen City of the Inland Empire", Spokane is a city of 125,000 population, located on the Spokane River in Northeastern Washington.

Its large flying field, 2600 by 6000 ft. is level as a floor, and natural drainage is provided so that the field can be used every day of the year. It is municipally owned and is the base of the 116th Aerial Observation Unit, Washington National Guard. Three large government hangars and quarters for six planes are available.

Laborers have been at work for several weeks grubbing out rocks that have roughened the outside edges of the flying field and are making the entire expanse available for landings. Prevailing winds blow lengthwise of the field, which has been used as landing area for more than fifteen years.

Spokane is on the proposed Northern air mail route and one of the purposes of the cross country race from New York will be to prove the feasibility of the northern line for air mail purposes. Cooperation of business men and others to make the race a success and entertainment of the fliers complete has been almost unanimous.

Lieutenant W. R. Taylor, photographic officer, has completed the taking of pictures in the Inland Empire for use in exploitation of the Columbia Basin, an irrigation area. He also has taken pictures of the downtown district for use in connection with the big air races.

Extensive plans for expansion of the air mail business out of Spokane have been made by the Walter T. Varney

## INDEX TO ADVERTISERS


Acme Wire Co. ..... 1325
Advance Aircraft Co. ..... 1271
Aero Supply Co. ..... 1310
Aircraft Development Corp. ..... 1331
Aircraft Service Directory ..... 1331-1332-1333
Air Transport Equipment Co. ..... 1333
Alexander Aircraft Co. ..... 1336
Allison Airplane Co. ..... 1332
Allison Engineering Co. ..... 1304
American Society for the Promotion of Aviation ..... 1333

Barber & Baldwin ..... 1323

Carlisle Mfg. Co. ..... 1307
Cherry Trading Co. ..... 1331
Classified Advertising ..... 1334
Crawford Airplane Corp. ..... 1332
Curtiss Flying Service, Inc. ..... 1272

Dayton Wire Wheel Co. ..... 1308
Detroit Aero Motors Co. ..... 1332

Eclipse Machine Co. ..... 1306
Edo Aircraft Corp. ..... 1322
Embry-Riddle Co., Inc. ..... 1332
Ericson, F. G. ..... 1333

Gordon & Ferguson, Inc. ..... 1321
Guggenheim School of Aeronautics ..... 1332

Hall, Inc., Chas. Ward ..... 1321
Hamilton Aero Mfg. Co. ..... 1327
Hartzell Walnutt Propeller Co. ..... 1331
Harvie & Gorrie ..... 1333
Haskelite Mfg. Corp. ..... 1304-1332
Hassell, Inc., John ..... 1301

Ireland, G. S. ..... 1327
Irving Air Chute Co. ..... 1310

Johnson Motor Products Co. ..... 1331

Kreider-Reisner Aircraft Co. ..... 1332

Larsen Aircraft, R. O. ..... 1333
Logan Airplane Co., Floyd J. ..... 1323
Long Island Packing Box Co. ..... 1309
Ludington Flying Service, Inc. ..... 1332
Luthy Co., F. A. ..... 1331

Macwhyte Co. ..... 1310
Mallette & Son, J. E. ..... 1331
Memphis Airport Co. ..... 1331
Meyrowitz, Inc., E. B. ..... 1331
Monumental Aircraft, Inc. ..... 1331

National Aeronautic Association ..... 1323
New Jersey Veneer Co. ..... 1298
Nicholas-Beazley Airplane Co. ..... 1325-1331

Packard Motor Car Co. ..... 1270
Paragon Engineers, Inc. ..... 1333
Paramount Welding Aluminum Products Corporation ..... 1305
Parker Appliance Co. ..... 1305
Perry-Auston Mfg. Co. ..... 1309-1331
Phenix Aircraft Products Co. ..... 1332
Pioneer Instrument Co. ..... 1308
Pratt & Whitney Aircraft Co. ..... 1296

Roebling's Sons Co., John A. ..... 1308
Russell Mfg. Co. ..... 1309
Ryan Airlines, Inc. ..... 1324

Sauzedde Corp. ..... 1307
Schroeder & Co., J. L. ..... 1331
Scintilla Magneto Co. ..... 1301
Service Steel Co. ..... 1301
Shepard & Co., H. G. ..... 1307
Smith & Co., Edward ..... 1299
Smith-Hafecost, Inc. ..... 1308
Southern Airways, Inc. ..... 1332
Spalding Bros. Co., A. G. ..... 1324
Sperry Gyroscope Co. ..... 1320
Standard Steel Propeller Co. ..... 1300
Strauss & Buegeleisen ..... 1332
Summerill Tubing Co. ..... 1310

Thurston, W. Harris ..... 1297
Titanine, Inc. ..... 1324
Travel Air Mfg. Co. ..... 1326
Twining & Co., E. S. ..... 1306

University Aerial Service Co. ..... 1332

Van Schaack Bros. Chemical Works, Inc. ..... 1326
Vimalert Co., Ltd. ..... 1332
Vought Corp., Chance ..... 1295-1311

Wallace Aero Co. ..... 1333
Where to Fly ..... 1328-1329
White, S. S. ..... 1309
Wies, Inc., Geo. A. ..... 1331
Wood Elastic Web Co., J. W. ..... 1326
Wright Aeronautical Corp. ..... 1274

Company which operates the line between Pasco, Wash., and Salt Lake City. They have opened a Spokane office in the Mohawk Building and Hal Nourse has been placed in charge.

Frank Bell, Varney representative, said a survey of the West has been made with a view of linking Spokane, Seattle, Portland and Pasco by air lines.

Nick B. Mamer, Swallow agent in this district, has sold seven new Swallows this season and has more prospects.

Jack "Tex" Rankin, Portland, Ore., flier, was in Spokane recently en route east to procure a new Waco-10.

## UNITED STATES AIR FORCES

### The National Guard Air Corps

There are at present in this country sixteen Federally recognized observation squadrons and photo sections, the organizational scheme being the Division Air Corps consisting of one squadron and one photo section for each of eighteen Infantry divisions. The budget for 1928 provides for an additional Division Air Corps, while another is provided in the tentative estimates for the Fiscal Year 1929.

In the units now Federally recognized, the National Guard has 201 pilots, twenty-three observers and fifty-eight non-rated officers acting as observers. There are vacancies in the existing units for 235 flying officers, 103 of whom should be pilots.

Under regulations issued by the Militia Bureau, airplanes issued to the National Guard are piloted only by officers holding a pilot's rating recognized by the Chief of Air Corps. The 201 pilots in the National Guard are keeping up their training, as evidenced by the fact that during the Fiscal Year 1926 they flew a total of 11,953 hr., an average of over 67 hr. per pilot.

The National Guard was originally equipped with the JN type of training plane, a war surplus. These airplanes were turned over to the National Guard as a free issue, but a charge of $2,000 for reconditioning each plane was made by the Army Air Corps. In the first years of the existence of Air Corps units in the National Guard, practically all parts, both airplane and engines, were a free issue. This equipment being gradually diminished, it was realized that the JN plane would have to be replaced by a new type. A board of officers convened by the Chief of the Militia Bureau to study the replacement question recommendd the substitution for the JN plane in each squadron of three standard observation planes and five advanced training planes.

Orders by the Chief of Air Corps to Depots that no more JN airplanes would be given major overhauls, made it evident that the National Guard in the immediate future would be without flying equipment. Recently, however, a contract was let for thirty-five O-1 airplanes for issue to National Guard organizations, and hope is being entertained that some, if not all of these planes will be supplied in time for the field training during 1927.

Units of the National Guard Air Corps, their location, composition, etc., are given below, as follows:

26th Division, Massachusetts National Guard, Boston, Mass. (101 Observation Squadron, 101st Photo Section and Medical Detachment,) Major Charles H. Wooley, Commanding. Commissioned personnel numbers 17, including one medical officer. Of these officers, 13 are rated pilots, 2 observers and 2 not rated. Lieut. Clarence E. Shankle, Air Corps, is the instructor.

27th Division, New York National Guard (102nd Observation Squadron and 102nd Photo Section,) Major George A. Vaughn, commanding, is stationed at Miller Field, New Dorp, S. I., N. Y. The commissioned personnel number 17, including one medical officer, Lieut. Marion L. Elliott, Air Corps is the instructor.

28th Division, Pennsylvania National Guard (103rd Observation Squadron, 103rd Photo Section and Medical detachment,) Major John S. Owens, Commanding, has 16 commissioned officers. Lieut. Earle J. Carpenter, Air Corps, is the instructor. The Philadelphia Municipal Airport is used as the flying field. It was secured by the City at a cost of $250,000. An additional sum of $15,000 was spent on grading and leveling the field, and it is contemplated spending $5,000 more for this purpose this year.

29th Division, Maryland National Guard (104th Observation Squadron, 104th Photo Section and medical detachment) is commanded by Major W. D. Tipton, and has 24 commissioned officers and 94 enlisted men. Capt. E. C. Black, Air Corps, is the instructor. Logan Field, Dundalk, Md., is used as the flying field.


More and more, shrewd buyers of aircraft are coming to depend on

Choose YOUR airplane carefully. Choose Travel Air—you won't go wrong!

*Literature on request.*

TRAVEL AIR MFG. CO., INC.

Dept. A WICHITA, KANSAS.

MODERN MILITARY AND COMMERCIAL PLANES
*Are Equipped With Our*
SHOCK ABSORBER CORD

Pioneers in the Manufacture of Elastic Cord for Shock Absorbers in this Country.

Principle Producers of Cord for Canadian and U. S. Governments during the World War.

Fully Equipped for the Largest Requirements or Any Experimental Tests.

J. W. WOOD ELASTIC WEB CO.
STOUGHTON, MASS., U.S.A.
New York Office—45 E. 17th St.; Canada—32 St. Peter St., Montreal

NITRATE DOPE

NEW PRODUCTION IMMEDIATE SHIPMENT

*Contractors to U.S. Army and Navy*

VAN SCHAACK BROS. CHEMICAL WORKS
3358 AVONDALE AVE. - CHICAGO, ILL.

30th Division, Tennessee National Guard (105th Observation Squadron, 105th Photo Section and Medical detachment) with Major John C. Bennett, Jr., commanding, and Lieut. Wm. V. Andrews, Air Corps, as instructor, is stationed at Blackwood Field, Nashville, Tenn. The commissioned personnel of 24, including the flight surgeon, are, with the exception of two, rated, there being 6 airplane pilots, 13 junior airplane pilots and 3 observers.

31st Division, Alabama National Guard (106th Observation Squadron, 106th Photo Section and Medical detachment) with Major Sumpter Smith, commanding, and Capt. Assa N. Duncan, Air Corps, as instructor, is stationed at Birmingham, Ala. Roberts Field in that city is used as the flying field. The commissioned personnel total 22, including the flight surgeon.

32nd Division, Michigan National Guard (107th Observation Squadron, 107th Photo Section and Medical detachment,) with Major Floyd E. Evans, commanding, and 1st Lieut. Edgar T. Selzer, Air Corps, as instructor, comprises 14 officers, including flight surgeon. The field used is part of Rouge Park, owned by the City of Detroit, located about eleven miles from the City Hall but not more than seven miles from the center of the residential district. It is about two miles due north of the Ford Airport. In addition to their new Truscon steel hangar, the squadron has built with squadron funds two other buildings adjoining it, one to accommodate the headquarters of the squadron and the other the headquarters and supplies of the photo section, the squadron supplies, a machine shop and class room.

34th Division, Minnesota National Guard, St. Paul, Minn. (109th Observation Squadron and 109th Photo Section,) with Major Ray S. Miller, commanding, is stationed at Chamberlain-Wold Field. A total of 19 officers comprise the commissioned personnel, Lieut. George M. Palmer, Air Corps, being the instructor. There are 15 rated pilots in this organization.

35th Division, Missouri National Guard (110 Observation Squadron, 110th Photo Section and Medical detachment,) with Major Charles R. Wassall, commanding, and Capt. Harry H. Young, Air Corps, as instructor, uses Lambert Field, St. Louis, Mo., as their flying field. Seventeen officers comprise the commissioned personnel.

36th Division, Texas National Guard (111th Observation Squadron, 111th Photo Section and Medical detachment,) with Major Bernard A. Law, commanding, and Lieut. Walter H. Reid, Air Corps, as instructor, has a commissioned personnel of 17, including one medical officer. Ellington Field, Houston, Texas, is used as the flying field.

38th Division, Indiana National Guard (113th Observation Squadron, 113th Photo Section and Medical detachment,) is commanded by Major Richard F. Taylor, and has a commissioned personnel of 20, including flight surgeon. Capt. Harvey W. Cook, Air Corps, is the instructor. With the exception of the flight surgeon, all officers are rated, 18 being junior airplane pilots and one observer. The new municipal airdrome at Indianapolis, Ind., is used as the flying field.

40th Division, California National Guard (115th Observation Squadron, 115th Photo Section and Medical detachment,) with Major Corliss C. Moseley, commanding, comprises 13 officers, including one medical officer. Griffith Park, Los Angeles, Cal., is used as the flying field.

41st Division, Washington National Guard (116th Observation Squadron, 116th Photo Section and Medical detachment,) with Major John T. Fancher, commanding, has a commissioned personnel of 17, Lieut. Caleb V. Haynes, Air Corps, being the instructor. Parkwater Field, Spokane, Washington, is used as the flying field.

43rd Division, Connecticut National Guard (118th Observation Squadron, 118th Photo Section and Medical detachment,) Major William F. Ladd, commanding, and Lieut. Louis N. Eller, Air Corps, instructor, has a commissioned personnel of 18, including flight surgeon. The Municipal Field at Hartford, Conn., is used as the flying field.

45th Division, Colorado National Guard (120th Observation Squadron, 120th Photo Section and Medical detachment) is commanded by Major Wm. H. Dayton. The commissioned personnel totals 26 officers, including flight surgeon. Captain Floyd N. Shumaker and Lieut. Charles G. Brenneman, Air Corps, are the instructors. Lowry Field, Denver, Colo., is used as the flying field. One separate flight of the squadron is stationed at Pueblo, Colo.

154th Observation Squadron, Arkansas National Guard, is commanded by Major Asbury W. Meadows, Lieut. Leland R. Hewitt, Air Corps, being the instructor. There are 13 commissioned officers in this organization, and the Little Rock Airport is used as the flying field.

## Army Air Orders

Capt. Charles L. Mullins, Jr., Air Corps (Inf.), is relieved from detail in the Air Corps and from duty with the 2nd Div., Fort Sam Houston, Tex. He is assigned to the 25th Inf., Camp Harry Jones, Douglas, Ariz.

First Lieut. Albert F. Hebbard, Air Corps (Scott Field), Ill., now at the Walter Reed General Hospital, Washington, D.C., will proceed to his home and await retirement at the convenience of the Government.

First Lieut. Ewart G. Plank, Air Corps (Corps of Eng.), is relieved from detail in the Air Corps, and from duty at Fort Sam Houston, Tex. He is assigned to the 2nd Eng., Fort Sam Houston, Tex.

Spec. Order No. 113, relieving Sec. Lieut. Alexander R. Sewall, Air Corps, (Field Art.), from duty with the 2nd Div., Fort Sam Houston. Tex., assigning him to the 17th Field Art., Fort Bragg, N.C., is ammended so as to assign him to the Field Art. of the 2nd Div., Fort Sam Houston, Tex.

Sec. Lieut. William L. Coughlin. Air Corps (Field Art.) is relieved from detail with the Air Corps and from duty with the 2nd Div., Fort Sam Houston Tex. He is assigned to the 6th Field Art., Fort Hoyle, Md.


BARGAINS

| | |
|---|---|
| OX-5 piston rings | $.15 |
| Safety belts | 3.50 |
| 26x4 tires | 6.00 |
| Magneto Cables per set | 6.00 |
| First Aid Kits | 1.00 |

*Before buying get our quotations*

Also turnbuckles, OX-5 and C-6 parts, JN4D parts and supplies.

**Ireland Aircraft, Inc.**

**Garden City, Long Island**

TRADE HAMILTON MARK
PROPELLERS

**STANDARD EQUIPMENT FOR RYAN MONOPLANES**

***carried in stock for immediate delivery***

**HAMILTON AERO MFG. CO.**

60 KEEFE AVE., MILWAUKEE, WIS.

***Keeping Abreast***

of aeronautical activities is possible only by reading

AVIATION

each week. Yearly subscription rates: United States $4; Canada $5; Foreign $6.

AVIATION

250 W 57TH ST. NEW YORK CITY

# Where to Fly

*CALIFORNIA*

**THE RYAN SCHOOL OF AVIATION**

O. B. STAR ROUTE SAN DIEGO

*Ideal flying weather all Seasons. Very best of planes and instructors. Opportunity to study latest planes and construction.*

A few recommended students will be given employment in our shops, while learning to fly.

*CONNECTICUT*

**NEW ENGLAND AIRCRAFT CO., INC.** New England's largest, most complete airdrome, of 96 acres. Commercial flying service. Complete flying instruction. Inter-city passenger and light express service by appointment. Advertising, photography. Our rates are reasonable and we make commercial pilots. Waco 9 distributors for New England.

805 MAIN ST., HARTFORD, CONN.

**NEW HAVEN** *Specialists in Seaplane Flying.*

**AIR TERMINAL, Inc.** P. O. Box 919 New Haven, Conn.

Send for particulars of our Seaplane Flying School. We have the best facilities, newest equipment and competent instructors.

*Distributors of* Hess Airplanes & Hess-Edo Equipped Seaplanes.

*FLORIDA*

**McMULLEN AVIATION SCHOOL**

*Modern Equipment — Expert Instructors — Large Field*

P. O. Box 4272 Phone H45-144 Tampa, Fla.

*IDAHO*

**WALTERS FLYING SERVICE**

**BOISE, IDAHO**

COMPLETE FLYING INSTRUCTIONS AND GROUND COURSE

Learn to Fly at High Altitude—then you can fly any place

*ILLINOIS* *Only 50 miles west of Chicago*

**EAGLE AIRPORT SCHOOL OF AVIATION.**

Herman J. Neubauer, M.D.

Hinckley, Ill.

Learn to Fly at our up-to-date school at very reasonable prices. Complete ground and air course. Come any time. Ideal accommodations for students. Expert instructors. Write for information.

*ILLINOIS*

**MID-WEST AIRWAYS CORPORATION**

**MONMOUTH, ILLINOIS.**

Complete flying instruction and ground course. Large safe field and good airplanes. Distributors for the new Waco airplane.

**CHICAGO AERONAUTICAL SERVICE**

INCORPORATED

Fly in the newest type, fastest and safest commercial planes. Licensed planes and pilots. Write for free booklet.

608 South Dearborn St., Chicago, Ill.

*ILLINOIS*

**HEATH AIRPLANE COMPANY, Inc.**

*Oldest aeronautic establishment in U. S.*

Airplane Supplies Flying School

2856 Broadway Chicago

*ILLINOIS.* **YACKEY'S CHECKERBOARD FLYING FIELD.** *Operated by the Yackey Aircraft Co., one of the oldest flying schools in the U. S.* The Yackey Aircraft Co. is conducted by men who have made a success in all branches of flying before the war — — in the war and after the war — — U. S. Army, U. S. Air Mail and Civilian. You can only learn from one who knows. You only know from experience. We have proven our ability. YACKEY AIRCRAFT COMPANY, Forest Park, Illinois.

*ILLINOIS* **Campbell De Schepper Airplane Co., Inc.**

Best equipped commercial field in the middle west. 24 hour service with night flying equipment and used by N. A. T. mail line Chicago to Dallas. A limited number of students accepted for training at reasonable rates. We invite cross country pilots to make use of our facilities.

*Mail address* 515-15 ST., MOLINE, ILLINOIS.

*ILLINOIS* **Pal-Waukee Airport & Service Station.** *Distributors of new Swallow Airplanes.* The Field with New Equipment. Chicago's new and most modern airport, four-way field, 2200 X 1200 ft., hangars, shops and supplies. Board and room near field. Located on Milwaukee Ave. at Palatine Road, 20 miles northwest of Chicago loop, 5 miles north of Des Plaines, Ill. Convenient and courteous service to visiting pilots. Pal-Waukee Airport, *P. O. Address* Mount Prospect, Ill.

**LEARN TO FLY ON NEW 1927 WACO PLANES**

COMPLETE FLYING AND GROUND COURSE $125.00

*Send for Catalog*

*DISTRIBUTORS FOR WACO AIRPLANES*

DAVENPORT AIRPORT INC. DAVENPORT, IOWA

*KANSAS*

**ALLISON AIRPLANE CO.** *Winter Flying Instruction.*

Special rate $100. Room and board $8 a week. Modern planes only used here. Commercial and sport planes at attractive prices. Our factory gives training in airplane construction and an opportunity to assemble your own plane from parts and save money LAWRENCE KANSAS

*MARYLAND* LOGAN FIELD

**CHESAPEAKE AIRCRAFT COMPANY, Headquarters** Armory, Baltimore. Passenger and express service. Aerial photography and advertising. Flying school $250. for course. No bond for solo. *Agents for TRAVEL AIR Planes, Maryland, Virginia & District of Columbia.* Phone Vernon 3760.

*MASSACHUSETTS* *SCHOOL OF FLYING*

**BOSTON AIRPORT CORPORATION**

Thorough Flying Instruction—on new modern, steel constructed planes. Flying from Boston Airport. Regular Army, National Guard and U. S. Air mail atmosphere. (Terminus for Colonial Airlines, Inc.) We are distributors for Travel Air airplanes for New England. P. O. Box 126, EAST BOSTON, MASS.

*MICHIGAN*

**NILES AIRWAYS SCHOOL OF AVIATION**

Michigan distributors for the Eaglerock. Learn to fly on 1927 production ships. No bond required for solo flight. Fly an Eaglerock—It means safety and performance with economy. Let us demonstrate—Write or wire

NILES AIRWAYS NILES, MICHIGAN

*MICHIGAN* **LEARN TO BUILD AIRPLANES**

OVERCASHNER AVIATION SCHOOL

8 Arcadia Building, 3513 Woodward, Detroit, Michigan.

*Please forward information on practical commercial aviation courses.* X .....

Motor expert — Construction — Flying *Established 6 years.*

**COMPLETE FLYING COURSE, 15 HOURS, $200.**

All training on Eaglerock Airplanes with individual instruction. No classes, enter any time and stay as long as you like. We operate Richards Field Storage and Service, used by Army and Air Mail. Every kind of airplane can be seen in operation here.

BENNETT EAGLEROCK SALES COMPANY

223 WEST 12TH STREET, KANSAS CITY, MO.

*MISSOURI*

**BRIDGETON AIRCRAFT CORPORATION**

ST. LOUIS FLYING FIELD ANGLUM, MISSOURI.

Thorough flying instructions by the hour or complete course. Ground and air work given by competent instructors. Only new planes used. A personal interest taken in each student.

DISTRIBUTORS OF ALEXANDER EAGLEROCKS

*"The School of Superior Training"*—Kansas City Flying School —New 1927 ships—Master Instructors—10 hour course complete $150; 15 hour course complete $200. Both courses include Solo—Cross Country—Spins and emergency Landings. Advance Course in Stunt Work $250. We qualify you for Government License. Our Graduates CAN FLY. No classes—All individual instruction. Write for FREE outline of our courses. 206 Admiral Blvd., Kansas City, Missouri.

*MISSOURI*

**MUNICIPAL FLYING FIELD.** Rates $15.00 per hour. Come when you can and stay as long as you like. Can use a few students to work out part of tuition. No extra charge for oil or gas. Board and room $8.00 per week. All instruction is personal and no charge for ground school or learning to taxi. *Write* LEE R. BRIGGS, MEMPHIS, MO., *for further particulars.*

*MISSOURI*

**NICHOLAS-BEASLEY AIRPLANE CO.** Complete flying instructions, by hour or by complete course, primary, cross country, advance training, solo. New ships and new motors. Instructors who take an interest in you. No deposit required on solo flight. Write for full particulars. MARSHALL, MISSOURI.

# Where to Fly

## CONTINUED

*MISSOURI* A job for those who want to learn to fly. We can arrange employment for 15 young men in an aircraft factory in Kansas City which will pay enough for room and board while you are taking your flying course. If you make good in the factory, permanent employment awaits you. 10 hour course $200., and 15 hour course $250.

Porterfield Flying School, 2330 Harrison St., Kansas City, Mo.

*MONTANA - - - IDAHO - - - WYOMING*
Montana Air Service Company, Inc. WACO DEALERS
Flying classes at Dillon, Montana, Missoula, Montana, and Torrington, Wyoming. Learn to fly in the altitude where you expect to continue flying. Experienced instructors, in flying, and mechanics. DILLON, MONTANA.

*NEBRASKA*
LEARN TO FLY at the LEXINGTON SCHOOL of AVIATION
LEXINGTON, NEBRASKA
Complete flying course $175.00 or $20.00 per hour, no charge for ground school. Taxi service 20c per mile any where, any time. We fly new planes only. Distributors for Swallow airplanes.—G. B. MORTON, *President*

*NEW JERSEY* MURCHIO FLYING SERVICE
Complete flying instructions at $20.00 per hour or complete course. All instructions on Brand New Air King Planes. Instruction on your own Air King plane at $5.00 per hour.
Thomas A. Murchio, Hamburg Turnpike, Paterson, N. J.
*New Jersey Distributors of Air King Airplanes.*

*NEW YORK*
CURTISS FLYING SERVICE INC., GARDEN CITY, N. Y.
In 1926, this company flew more than 175,000 miles, carried 3800 passengers, and taught 95 students to fly—all without accident or injury to anyone. Equipment and personnel already licensed under new Department of Commerce regulations.
*Write for our flying school booklet.*

*NEW YORK*
FLYING SCHOOL—Operated in connection with our shops assuring a Liberal Knowledge of Design and Construction at no additional expense. Competent Instructors. *Reliable Machines.* Passenger Flights and Cross Country Service. Write for Details. AERIAL SERVICE CORP., HAMMONDSPORT, N. Y.

*OHIO*
JOHNSON FLYING SERVICE
DAYTON, OHIO
GRADUATES OF OUR SCHOOL HAVE A REAL ADVANTAGE
*A Flying School of Distinction. Write for Further Particulars.*

*OHIO*
INDIAN LAKE AVIATION COMPANY
RUSSELL'S POINT, OHIO.
Learn to fly for $125.00 at Indian Lake, Ohio's million dollar playground. First class at this price, starting Nov. 1. We are in our seventh successful season of training and passenger work.

*OHIO*
*COMPLETE FLYING COURSE*
We guarantee to teach you to fly.
All year round school. Individual instruction.
THE EMBRY-RIDDLE COMPANY, WACO DITRIBUTORS
LUNKEN AIRPORT CINCINNATI, OHIO

*OREGON*
HARRIS-RANKIN FLYING SERVICE, INC.
*Oldest And Best Equipped Flying School in Northwest.*
NORTHWEST WACO DISTRIBUTORS
P.O. Box 4268 AVIATION SUPPLIES PORTLAND, OREGON.

*PENNSYLVANIA* *PITTSBURGH*
BETTIS FIELD
Pittsburg Air Mail Terminal, C.A.M. No. 11.
*20 Minutes from heart of city.*
LOVEJOY FLYING SCHOOL MODERN EQUIPMENT
Mail address: Box 411, McKeesport, Pa.

PITCAIRN AVIATION, INC.
*10-HOUR FLYING COURSE.* 4-way flying field, at Hallowell, Pa., the largest in the East, in midst of ideal flying country. All-year-round school. Modern flying equipment, including Pitcairn Orowings. Reasonable board and lodging near field. No liability bond required. *Write for illustrated booklet.*
LAND TITLE BUILDING, PHILADELPHIA

*TEXAS* Year-round Flying
SAN ANTONIO AVIATION & MOTOR SCHOOL
Expert instruction in flying and mechanics
Free sleeping quarters at Airdrome
AIRPLANES, ENGINES, PARTS, SUPPLIES, SHOPS, HANGARS, OX5s, Hissos, Liberties, Jennies, Canucks, Standards
Large stocks on hand, prompt shipment, best values.
Office 509 Navarro Street San Antonio, Texas.

INTERNATIONAL FLYING SERVICE
*AN AVIATION SCHOOL*
The most complete flying course in America. Under personal supervision of Captain Bill Erwin—World War Ace. Big paying jobs await our graduates.
INTERNATIONAL FLYING SERVICE
LOVE FIELD DALLAS, TEXAS

*WASHINGTON*
MAMER FLYING SERVICE
1312 West Broadway Spokane, Washington
All flying instruction is personally given by Nick Mamer, former army, air mail, and forest patrol pilot. Ten years of flying experience. Rates very reasonable. Write.
*Distributors* SWALLOW AIRPLANES

*WHEN IN EUROPE TRAVEL BY AIR!*
Imperial Airways, the British Line between London and the Continent. Particulars from
IMPERIAL AIRWAYS, 578 Madison Ave. Plaza 0794

YOUR card, in this directory, serves to keep your flying service continuously before the readers of AVIATION at trifling cost. *Write for Rates*

AVIATION

250 West 57th Street, New York City

# PUBLISHER'S NEWS LETTER

It is safe to predict that within the next twelve months the front pages of the newspapers will be constantly given over to flights to all parts of the world. The publicity that has come to Captain Lindbergh and to the Chamberlin-Levine crossing has literally been the flame that is attracting aeronautical moths of every nationality. Financial backers appear to be willing to furnish the money for almost any kind of aerial venture. Cities and countries wish to use flights of extraordinary daring to advertise their advantages and skill. Newspapers are anxious to pay fabulous sums for news accounts. Motion picture magnates beckon with hands laden with large checks. Prizes are being put up with lavish generosity. Pilots who are even considering attempting to do a stunt flight are flooded with offers to use and carry this, that and the other product for a handsome honorarium. The movie star, the prize ring and the Channel swimmers will have to look to their laurels.

* * * *

Which all goes to demonstrate two things. The public wants a hero to worship and from the earliest days the defying of death has always been a lodestone of interest. One of the greatest attractions of flying for the young men who wanted to enter the aviation field has been that the man who flies has always been regarded as some sort of a superman by the man on the ground. He is regarded as a daring expert who risks his neck every time he takes-off. Passengers are always grateful at the conclusion of flights for what they feel has been their safety in the air. And pilots who stand out as record breakers and stunt demons are placed in even a higher class of their own, apart from other humans. Crowds always gather to see flying that carries with it a dangerous side. Straight flying appears to have lost its appeal. The termination of epochal flights brings together crowds such as those at Le Bourget and Croydon. All of which means that thousands of aviators all over the world are now dreaming of performing some feat that will place their names in the Aeronautical Hall of Fame.

* * * *

Now that the North Atlantic and South Atlantic have been conquered, all eyes are centered on the Pacific. More calculations have been made as to distances, weather conditions and possible air harbors of the Pacific in the last few weeks than in the last decade. The South Pole also has its lure. But the climax of man's flying achievement is to be the round-the-world speed record. Already several groups in this country are at work on this ultimate air route, and from abroad come reports of similar ambitions. All the continents have been criss-crossed so many times by aircraft that little new remains to be done over land. The ocean stretches are now under attack and then will come the grand climax of speed and distance in globe encircling. Fame and fortune await the successful. The rush has begun. Plane builders are being swamped with enquiries about equipment for long flights. Old timers who have been away from aeronautics for several years are trying to re-enter the field. Everybody is enthusiastic and optimistic.

* * * *

Just what effect all this great spurt will have on commercial aviation is problematical. For the first few months of this year the accident list gave a decided setback to popular confidence. Then, with typical fickleness, the trans-Atlantic flights have brought a renewed belief in the possibilities of aircraft. Once more, the dawn of aerial travel appears to the public to be flooding the horizon with rose colored prospects. It is just at this point that those who think seriously about the trend of aviation begin to become alarmed. The public does not distinguish between military, commercial or record breaking planes. All are air vehicles and whatever happens to one affects all. The backbone of the future growth of the aeronautical industry is not only the production of safe and economical aircraft, but of getting the public to realize that reliability has been achieved. If the other air hazards are surmounted with the same sad loss of life that has been caused by the trans-Atlantic attempts, there will be a natural questioning as to whether such flights are worth while. Commercial aviation that is struggling to get ahead would be adversely affected and the basis of our aeronautical prosperity threatened. Experimental licenses for aircraft permit owners to do almost anything with their planes. With the distance records now at over 3,800 miles, and the duration at over 50 hours, with the physical endurance stretched almost to the limit—is it not a time to give some thought to the possible effect of all the furore regarding commercial development? So far it has been good, but promoters of future record flights will do well to keep in mind the effect of misadventure on commercial aviation and adverse publicity upon an uninformed public.

# The Aircraft Service Directory

## WHERE TO PROCURE EQUIPMENT AND SERVICES


**Earth Inductor Compass**

**PIONEER INSTRUMENT COMPANY**

MAIN OFFICE AND FACTORY BROOKLYN NEW YORK

WASHINGTON 541 STAR BUILDING | PARIS 97 BOULEVARD SAINT MICHEL | SAN FRANCISCO 15 SPEAR STREET

**HARTZELL PROPELLERS ARE RELIABLE**

BUILT ON HONOR — THEY ARE GIVING EFFICIENT SERVICE ON ALL CLASSES OF MILITARY AND COMMERCIAL AIRPLANES

*Contractors to U. S. Government and Commercial Manufacturers*

*New OX Walnut Propellers for Quick Shipment*

**HARTZELL WALNUT PROPELLER CO.**

PIQUA, OHIO

**NICHOLAS-BEAZLEY AIRPLANE CO.**

**MARSHALL, MO.**

**FOR SALE** Used Jennies and Canucks $400.00 to $500.00. New Standard J-1's less motors, fuselages uncovered $550.00 5 place Hisso Standards $1000.00 to $1250.00. Will accept order and 10 % deposit on any of above ships and store free of charge until July 1st., 1927. Your deposit money fully covered by insurance.

FOR NIGHT FLYING & NIGHT ACROBATICS

*WIND-DRIVEN* **GENERATORS** (ROBBINS & MYERS)

*$45. PER UNIT INCLUDING PROPELLER*

13 volt — 33.6 amps. 5000 R.P.M. Weight 17½ lbs.

**FOR LIGHTING** RADIO AND OTHER USES

Black Walnut Propellers 15 inch, $5 each for clock mounting.

**CHERRY TRADING CO.,** 46 Howard St., New York City

Air Spec. 10225D

**SEAMLESS STEEL TUBING**

*Complete Warehouse Stock for Immediate Shipment in any Quantity.*

SERVICE STEEL CO. 1435 Franklin St. DETROIT, MICH.

**AIRCRAFT SUPPLIES**

Recent additions to our stock of wide variety and large volume of standard and utility aircraft materials and motor parts now enables us to give you prompt and efficient service.

Send for Catalogue No. 3. Special quotations on quantity orders.

**MONUMENTAL AIRCRAFT, INC.**

1030 N. Calvert St., Baltimore, Md.

**MEMPHIS AIRPORT CO.**

Most complete aeronautical school in Central South.

WACO DISTRS. AERIAL PHOTO SURVEYS

Memphis Municipal Airport, 8 miles north of city on Illinois Central R. R.

*COTTON DUSTING EVERY SERVICE*

**Post Office Box 3055, Crosstown Station, Memphis, Tenn.**

***New***

**— LIBERTY MOTORS —**

WITH ALL THE LATEST IMPROVEMENTS.

CAN SUPPLY FROM STOCK ANY NEW "LIBERTY" PARTS DESIRED.

*WRITE OR WIRE FOR PRICES.*

**JOHNSON MOTOR PRODUCTS, Inc.**

518 West 57 St., New York.

**EXPERT ADVICE ON YOUR AVIATION INSURANCE PROBLEMS**

Our policies are written to cover your individual insurance needs—Fire and Transportation, Public Liability, Property Damage, Personal Accident, Employer's Liability, Accidental Damage, Loss by Theft, Passenger Liability, Windstorm Damage and Workmen's Compensation.

*Our Consultation Service is Free. Let us know your problems.*

**JAMES E. MALLETTE & SON**

TORRINGTON, CONNECTICUT

UPSON AIRSHIPS

**ENGINEERS - CONTRACTORS**

LIGHTER-THAN-AIR CRAFT

METALCLAD AIRSHIPS

MOORING TOWERS

AIRCRAFT DEVELOPMENT CORPORATION

4461 JEFFERSON AVE., W. DETROIT, MICHIGAN

**TRAVEL AIR** AMERICA'S FOREMOST COMMERCIAL AIRPLANE

*Sold in* New York, New Jersey and Pennsylvania *by*

**GEO. A. WIES, INC.**

*Hangar* Curtiss Field | 12 Juniper Avenue Mineola, New York

***Meyrowitz* LUXOR GOGGLES**

Are worn by leading American military, naval and commercial pilots. *Contractors to U. S. Army and Navy*

E. B. Meyrowitz INCORPORATED Established 1875

520 Fifth Avenue at 43rd Street, New York City

Minneapolis St. Paul Detroit London Paris

*Write for Descriptive Circular*

LU-THE

*Accuracy and Quality guaranteed*

**Airplane Piston Rings**

Set of rings for OX5 parcel post — $3.50 — state oversize Wright Whirlwind, Salmson, Rickenbacker and others available. We manufacture and stock rings from 2⅝ inches to 5 inches ⅛", 3/16" and ¼" in automotive sizes.

*manufactured by*

**F. A. LUTHY CO.**

Jackson, Mich., U. S. A.

LARGE STOCK all models Hisso and OX5 motors and spare parts—Standard JI planes, wings, and spare parts—Instruments, propellers, dope, shock cord, wheels, tires and any accessory for the airplane. Our material is high grade and priced attractively.

**IMMEDIATE SHIPMENT**

**J. L. Schroeder & Co.,** P.O. Box 380, **Houston, Texas**

# The Aircraft Service Directory

## WHERE TO PROCURE EQUIPMENT AND SERVICES


**EVERYTHING FOR THE AIRPLANE**
*Send for Our Catalogue*
*LARGEST AIRPLANE SUPPLY HOUSE IN THE WEST*
A complete line of parts and accessories for aircraft at lowest prices.
A money-back guarantee on everything sold.
WRITE OR WIRE US YOUR REQUIREMENTS.
CRAWFORD AIRPLANE COMPANY
*"Masters of the Air."*
350 WASHINGTON BLVD. VENICE, CALIFORNIA

**HASKELITE PLYWOOD**
Only Plywood made to pass strict Grade "A" Navy Specifications.
Can be furnished in any size or thickness.
HASKELITE MANUFACTURING CORPORATION
133 W. WASHINGTON ST., CHICAGO, ILL.

**THE EMBRY-RIDDLE COMPANY, Inc.**
LUNKEN AIRPORT, CINCINNATI, OHIO
WACO *Distributors* WACO
Complete Line of Supplies on Hand
OX5 Motor Parts Complete Line
ALL BRANCHES COMMERCIAL AVIATION
WE *GUARANTEE* TO TEACH YOU TO FLY

**Ludington Philadelphia Flying Service**
Incorporated
OPERATORS PHILADELPHIA MUNICIPAL FLYING FIELD
PASCHAL P. O., PHILADELPHIA, PA.
Complete Field Facilities. Agents for WACO.
Modern Flying Instruction Course. "Lizette" Sport Monoplanes.
AERIAL TAXI SERVICE. PHOTOGRAPHY. ADVERTISING.
CITY OFFICE, ATLANTIC BLDG., PHILADELPHIA, PA.

**PHENIX NITRATE CLEAR DOPE**
at $1.35 per gal. in 50 gal. steel drums. Drums extra at $7.00 and full refund if returned in 90 days, freight prepaid. $1.42 per gal. in 50 gal. Wood Barrels. $1.45 per gal. in 30 gal. Wood Barrels. $1.60 per gal. in 5 gal. Boxed Cans.
WOOD BARRELS AND CANS INCLUDED AND NOT RETURNABLE.
*Immediate shipment f. o. b. Factory.*
*All fresh made from new and high grade materials.*
*No war stock or reworked materials.*
Phenix Aircraft Products Co., Williamsville, N. Y.

**The Goggles that Protect**
*Look for this trademark*
NON-SHATTERABLE
**RESISTAL GOGGLES**
*Write for catalog*
STRAUSS & BUEGELEISEN
30 Front St., Brooklyn, N. Y.

**THE DETROIT AERO MOTORS CO.**
10331 CHARLEVOIX AVE., DETROIT, MICH.
New OX5 Curtiss motors complete in their original cases singles $375.00.
New 220 Hispano's singles $300.
New Y type 35 h.p. Anzani's $285.00.

**THE UNIVERSITY AERIAL SERVICE COMPANY**
UNIVERSITY AIRPORT, AUSTIN, TEXAS.
Largest and best equipped commercial field in the Southwest. Prepared to meet your every need.
HISSO MOTORS, OX-5 MOTORS, AIRPLANE ACCESSORIES
Rebuilding and overhauling Hisso motors our specialty.
WACO DISTRIBUTORS • WACO
(New ships and parts carried in stock at our field)
*Year-round school offering complete flying course conducted by*
THE UNIVERSITY SCHOOL OF AERONAUTICS

**New Hispano propellers toothpick $30.00**
**Standard Lower wings $40.00**
**Flying suits unionalls $7.50**
MARVIN A. NORTHRUP
730 WASHINGTON AVE., NORTH MINNEAPOLIS, MINN.

**SPECIALS** New OXX6 pistons $2.25. Map cases $1.25; Gosport sets $5.00; 800 x 200 tubes $1.00; E Hisso cases, pair $95.00; Newly babbited bearings for Hisso motors $22.50 set; Hisso wrist pins 50c; Hisso exhaust stacks pair $12.50; Resistal Goggles $2.00; Mahogany and birch plywood 10c per square foot. Hamilton prop for Hisso $60.00. Many other bargains write for list. Everything for Standard, Canuck, T.M., D.H. & Jenny planes, Hisso and OX5 motors. All aviation supplies.
SOUTHERN AIRWAYS INC.
210 COLLEGE STREET, SAN ANTONIO, TEXAS

**Daniel Guggenheim School of Aeronautics**
Courses in Aeronautical Engineering and Industrial Aviation. For particulars apply to the Dean of the College of Engineering,
N. Y. University, University Heights, New York, N. Y.

Modernize your Standard LS5, Jenny or Canuck with single bay
**USA27 HIGH LIFT WINGS**
*Write for Photo, Specifications, Method of Installing.*
ALLISON AIRPLANE CO., Lawrence, Kansas

**KREIDER-REISNER AIRCRAFT CO., INC.**
*Waco Distributors*
Berling Booster parts $8.00, sent prepaid for cash with order. Battery and Coil Booster to take place of hand magneto for starting $6.00.
HAGERSTOWN MARYLAND

**LIBERTY 12**
**MOTORS *and* PARTS**
THE VIMALERT COMPANY, LTD.
807 Garfield Avenue, Jersey City, N. J.

## AIRCRAFT SERVICE DIRECTORY

CONTINUED


**PARAGON PROPELLERS**

*BETTER THAN EVER*

**Paragon Engineers, Inc.**

**Baltimore, Maryland**

THE MOST COMFORTABLE SAFETY BELT,

$5.00 APPROVED TYPE

*Positive Lock—Instant Release*

AIR TRANSPORT EQUIPMENT, INC.
Carle Place, L. I., N. Y.

F. G. ERICSON, F. R. Ae. S.

**AEROPLANES**

ROOM 1656
GRAYBAR BLDG.
NEW YORK, N. Y.

BOX 831
BALTIMORE,
MARYLAND

Actual Size

**SEND ONE DOLLAR**

We will send you by return mail a beautiful pair of sterling silver wings mounted on bar pin with safety catch, also identification card issued by National Flyers Ass'n. These pins are being worn by thousands of aviators, aviation mechanics and boosters.

**WALLACE AERO CO., Bettendorf, Iowa**

AUCTION SALE OF AEROPLANE

Instructed by the Canadian National Airways, we will sell by public auction on Wednesday, June 29th, 1927, at 2 p.m. sharp, at Johnstons Storage Warehouse, 1114 Hamilton Street, Vancouver, British Columbia, Canada, three cases containing Aeroplane, complete with Rolls-Royce Eagle VIII Engine, the property of Major Zanni, for payment of railway charges. Shipment will be sold in bond, subject to duty, with reserve bid. Cash or marked cheques only accepted. HARVIE & GORRIE, *Auctioneers*, Vancouver, B. C. R. W. Hannington, Asst. Regional Counsel, for Canadian National Airways.

**R. O. LARSEN AIRCRAFT,**

*Wisconsin Distributors For*

**WACO AIRPLANES**

If you want a Waco place your order now, to insure an early delivery. Don't delay. OX5 Engines. Used Airplanes.

LARSEN, WISCONSIN

Become a member of America's fastest growing Air Society.

Join the ASPA and wear the silver wings shown here.

Membership fee $1.00 which covers the cost of wings.

The American Society for Promotion of Aviation, Inc.

522 FIFTH AVENUE NEW YORK CITY

**AIRTITE IGNITION CABLE**

*"Install it and Forget it"*

Insulated with live rubber, protected with a Flexible Enameled Coating that is not affected by

**ENGINE OIL, GASOLINE, OZONE, SALT WATER, FRESH WATER**

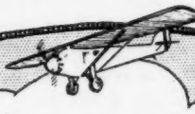
*Unequalled Performance Under Severe Corona Test*

Meets Army, Navy and S.A.E. Specifications. Highest grade spark plug cable you can buy. Human safety demands the best.

*Write for sample and test figures.*

**THE ACME WIRE CO.,** Dept. M, New Haven, Conn.

**AN ACME WIRE PRODUCT**



**NICHOLAS-BEAZLEY AIRPLANE CO., INC.**

**SPECIALS**

**WATCH THIS SPACE EACH WEEK**

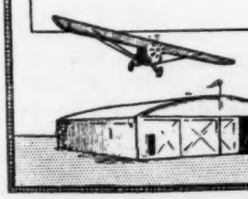
—

Helmets $1.25 to $6.00

Goggles $2.00 to $16.50

Summer Flying Suits (Lee) $9.00

Ground Mechanics Suits (Lee) $5.00



**Marshall, Missouri**

*We will be here tomorrow*

# CLASSIFIED ADVERTISING

10 cents a word, minimum charge $2.50, payable in advance.
Address replies to box numbers, care AVIATION, 250 W 57th St., New York.

Will exchange practically new OX-5 two place plane (Speed 110 MPH) for good car. Plane is in Pennsylvania. Box 611, AVIATION.

---

1—J.I. Standard complete. Not covered. Dual control, $350.00. 1—J.I. Standard all new covers. Natural finish. Dual control, $550.00 1—OXX6 motor in A-1 condition. Has not been run since overhauling. Cylinders have removable Graphite exhaust guides, $300.00. Illinois Flying Company, 507 Locust St., Sterling, Ill.

---

WANT two or three place ship in airworthy condition. Give best price, description and cost of delivery to Wm. Wegner, 157 North Street, Geneva, N. Y.

---

WANTED: To trade $2700.00 RAJO Racing Car, for a good Airplane. Car is new. Write for specifications of car. Address Eggenberger Electric Company, Pontiac, Ill.

---

FOR SALE: Latest Anzani 6A3 70-80 Motor. Flown 5 hours. Damaged by crash $350. A Krapish, Box 69, Westbury, L. I., N. Y.

---

FOR SALE: Canuck, practically new, now flying, can be seen by appointment, $800.00. Phone Columbia 5686. Howard Gulick, 2331 West Huntingdon St., Philadelphia, Pa.

---

Metal workers, welders, steel and duralumin experience. Men who can produce, wire or write, stating past experience, salary expected, etc. Moore, 16 East 11th, Tulsa, Oklahoma.

---

FOR SALE CHEAP: Fokker D7 newly rebuilt powered with Hisso motor. Curtiss JNH like new powerd Hisso Motor. Standard J1 three place power OX5. Also Hisso motors and parts. E. D. Anderson, 130 Crofton Ave., San Antonio, Texas.

---

YOUNG MAN wants work with Aircraft company or individual. Experiences: American School of Aviation home study course, understand maintenance of planes and motors, worked three months in Aircraft factory, and have some flying time. Will consider going to South America. Box 622, AVIATION.

---

WANTED: Small unassembled motorcycle plane. Material list, instruments. Must be complete, crated including all drawings. Priced right. Consider engine and prop. Box 621, AVIATION.

---

WANTED for Gates Flying Circus two licensed transport pilots. Must thoroughly understand Hissos. Also two good all-round airplane mechanics; best paying job in country to right men; old timers only. Novices save stamps. Address mail only, giving full qualifications first letter. Gates Flying Circus, 735 Whitehall Building, New York City.

---

WANTED: One used Wright Whirlwind Engine—Curtiss D-12 or new 180 HP. Hispano Suiza. Address P. O. Box 141, North Bellmore, L. I., N. Y.

---

FOR SALE: 25 new, 220 hp., Hisso motors; 5 new OX5 motors. Kettenburg Boat & Engine Works, Point Loma, Calif.

---

WANTED Pitcairn Orowing. Must be in good shape. Will pay cash. Wire. Airview, Inc., 211 Broadway, Long Branch, N. J.

---

FOR SALE: Cotton Cloth 30c yd. Pinked tape 3½c yard. Gasoline filters guaranteed to keep all water and dirt from carburetor and jet wells $2.10. G. J. Romkey, 1230 Washington St., Burlington, Iowa.

---

FOR SALE: Hammondsport OX5 never run since acceptance test in 1918. Complete with tools in Curtiss crate. Serial No. 4000. $350 if sold at once. Address Box 620, AVIATION.

---

New gasoline level gauges complete, $7.50. Dixie magnetos, new, for OXX6 motors $15.00. New tachometers, chronometric, wide graduation, easily read, $10.00. New type protector goggles $5.00. Brand new OXX6 motors $595.00. Air Transport Equipment, Carle Place, N. Y.

---

FOR SALE: Thomas Morse OX5 had 12 hours A.1. shape with the following spares: 2 lower and 1 upper wings, new set struts and wires. Ready to fly away, $800. V. A. Rickard, Schenectady, R.F.D. No. 8, N. Y.

---

FOR SALE: M. F. flying boat just overhauled, with new ribs and bottom, with model A Hisso motor. New Orleans Air Line, New Orleans, La.

---

150 HP. Hisso Standard used one season recently overhauled, 50 gal. gravity tank, ready to fly away, $950.00. James Sherry, 8th and North E. Richmond, Indiana.

---

OX5 Standard, fair condition, less undercarriage, wings; nearly new motor. Old motor, new Prop., complete tools, $300 cash. Located at South Caffeyville, Okla. Free samples high grade cotton fabric, 38c yard. Richard Gutosky, 1310 Hart Ave., Detroit, Mich.

---

ATTENTION: Graphite valve guides threaded into OX cylinders. Removable valve seats installed. Prices not prohibitive. Prices and descriptive literature upon request. Illinois Flying Company, 507 Locust St., Sterling, Ill.

*When*
*Buying — Selling — Exchanging*
*Planes, Motors, Accessories*
*Try*
THE AIRCRAFT SERVICE DIRECTORY
and
THE CLASSIFIED SECTION OF
AVIATION

*The Publishers of AVIATION announce the*

# American Aircraft Directory

A COMPLETE REFERENCE GUIDE
to the
AERONAUTICAL INDUSTRY OF THE UNITED STATES

AMERICAN AIRCRAFT DIRECTORY

—

Airports
Pilot Directory
Aircraft Companies
Company Officers
Air Routes
Maps
Seaplane Stations
Aircraft Officials
Emergency Fields
American Aces
American Airplanes
American Seaplanes
American Airships
American Engines
Aircraft Accessories
Flying Schools
Government Fields
Hangar Directory
Flying Guide
Rules and Regulations
International Air Laws
State Air Laws
Municipal Air Laws
License Fees
Certified Pilots
Aero Organizations
Air Records

THE DIRECTORY lists more than 2,000 pilots; 500 aircraft, accessory and operating companies; describes 500 active landing fields, and carries some 200 illustrations.

Aircraft, Accessory and Parts Companies are listed, with officers, products or services, in the respective state sections as well as in the Trade Index.

•

INFORMATION INDISPENSIBLE TO AVIATION EXECUTIVES, SALES AND PURCHASING DEPARTMENTS, AERO ORGANIZATIONS, CHAMBERS OF COMMERCE, MUNICIPAL AVIATION COMMITTEES, STATE AND NATIONAL LEGISLATORS, OPERATING COMPANIES AND AIRCRAFT PILOTS.

•

To avoid disappointment reserve your copies of the DIRECTORY now, as advance orders indicate that the first edition quickly will be sold out. Cloth Bound $5.00. Paper Bound $3.00.

•

THE ADVERTISING PAGES CARRY THE SALES MESSAGES OF THE LEADING AIRCRAFT, PARTS AND MATERIAL MANUFACTURERS.

IF YOUR COMPANY HAS NOT YET RESERVED ADVERTISING SPACE, DO SO NOW IF YOU WISH TO BE REPRESENTED. YOU WILL REGRET THE OMISSION OF YOUR ADVERTISEMENT FROM THE DIRECTORY.

## AVIATION PUBLISHING CORP.

250 WEST 57TH STREET, NEW YORK CITY

*DEMONSTRATED AND SOLD BY TWENTY-FIVE DEALERS*

*West Coast of Florida*—Wesley N. Raymond, Puntagorda, Fla.
*Georgia*—Georgia Airways, Inc., Candler Field, Atlanta, Ga.
*Ky. and Tenn.*—Datin Eaglerock Sales Co., 2031 Central, Memphis.
*N. C. and Va.*—Charles Flying Service, 3100 Garland, Richmond, Va.
*Minn. and Iowa*—Miller Eaglerock Airways, 1225 W. 12th St., Des Moines, Iowa.
*Indiana*—Captain J. A. Yonge, P. O. Box 1185, Indianapolis, Ind.
*Michigan*—Niles Airways, Niles, Michigan.
*N. Y. and Conn.*—T. D. S. Aerial Service, Inc., 35 W. 23rd St., N. Y. C.
*Wisconsin*—Hall Aircraft Co., 101 Scott St., Wausau, Wisconsin
*Ill. and S. Wisc.*—Sievert Aircraft Corp., 5934 So. Cicero, Chicago, Ill.
*E. Mo., Ark. and S. Ill.*—Bridgeton Aircraft Corp., 223 Pierce Bldg., St. Louis
*W. Mo. and E. Kan.*—Bennett Eaglerock Sales Co., 223 W. 12th St., K. C., Mo.
*Okla. and Tex. Pan.*—Southwest Airplane Sales Corp., Britton, Okla.
*N. M. and Cen. Texas.*—Swastika Eaglerock Airways, 312 Columbia Ave., Albuquerque, New Mexico
*Southern Texas*—Marion P. Hair, P. O. Box 429, San Antonio, Texas
*So. Cal. and Ariz.*—Aero Corporation of California, Western Ave., at 99th St., Los Angeles
*Northern California*—Jas. L. Mayberry, 1210 B'way, Fresno
*W. Washington & W. Oregon*—Story Eaglerock Sales, Seattle, Washington
*Wyo., Mont. and W. Neb.*—Wyoming Airways, Casper, Wyoming
*S. Dak. and N. Dak.*—Rapid City Air Lines, Inc., Rapid City, S. D.
*W. Kan. and E. Neb.*—C. E. Steele, Dodge City, Kansas
*La.*—Louisiana Airways, 1712 Pere Marquette Bldg., New Orleans
*W. Va. and E. Ohio*—Lyle E. Scott, 328 2nd St., Marietta, Ohio
*Utah, Nevada, S. Idaho*—Rocky Mountain Airways, Salt Lake City
*Mississippi*—Tri-States Airways, Bry Block, Memphis, Tenn.

Dept. of Com. Approved Type Ctf's. Numbers 7 and 8

TRADE MARK REG.

# Lindbergh's Endorsement

In February 1927, "Slim" Lindbergh flew an Alexander Eaglerock, enthused over its qualities and construction and then asked the demonstrators from Alexander Aircraft Company to build him a Whirlwind motored Eaglerock for a New York to Paris hop.

President J. Don Alexander realized the importance of Lindbergh's offer and agreed with him that a Whirlwind motored Eaglerock was a logical job for the trip but — orders for the standard type Eaglerock needed to be filled and rather than break the line of production, Lindbergh's offer was rejected.

Let all due credit be given to the intrepid and successful flyer, his gallant ship and the Whirlwind motor that carried through. The fact still remains, that the —

EAGLEROCK WAS SLIM'S CHOICE.

LETTER

St. Louis, Mo.,
February 7, 1927.

Alexander Aircraft Co.,
Denver, Colo.

Gentlemen:

I wish to add my small share to the general sentiment for your Eaglerock. I have been rather skeptical on the average "new production" job for "commercial" work.

At the present moment my opinion is entirely changed. I never hoped to see any OX-5 motored ship perform as the Eaglerock performed for me during the severe test I gave it some days ago. I have never felt as though I could trust implicitly in any new production commercial ship, until I had the pleasure of piloting this Eaglerock. I climbed in doubtful and climbed out a convert.

It is the most beautiful performing thing I have ever flown. It has strength and a degree of maneuverability heretofore considered hopeless in any aircraft.

I am, of course, speaking of commercial ships and not of army pursuit or other high-powered army types.

Very truly yours,

(Signed) Charles A. Lindbergh,
Chief Pilot, St. Louis-Chicago Air Mail.

ALEXANDER AIRCRAFT CO.
ROOM 401
DENVER, COLORADO